

The Economic Dimensions of Literacy in Portugal: A Review

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Abbreviations

ALBSU	Adult Learning and Basic Skills Unit
ALL	Adult Literacy and Life-skills survey
CHRTC	Canadian Human Resources Trucking Council
DFID	Department for International Development
EES	European Economic Space
EFA	Education For All
ETS	Educational Testing Service
EU	European Union
EUROSTAT	Statistical Office of the European Communities
EURYDICE	Education Information Network for Europe
GATT	General Agreement on Tariffs and Trade
GDP	Gross Domestic Product
HRDC	Human Resources Development Canada
IALS	International Adult Literacy Survey
ICT	Information and Communication Technology
ISCO	International Standard Classification of Occupations
LSAL	Longitudinal Study of Adult Literacy
MERCOSUR	Mercado Comum do Sul
NAFTA	North American Free Trade Agreement
NALS	National Adult Literacy Survey
OECD	Organisation for Economic Co-operation and Development
PIRLS	Progress In Reading Literacy Study
PISA	Programme for International Student Assessment
TIMSS	Trends In Mathematics and Science Study
UIE	Unesco Institute for Education
UN	United Nations
UNESCO	United Nations Educational, Scientific and Cultural Organisation
YALS	Young Adult Literacy Survey



Executive Summary

This report presents a non-technical overview of how economists think about literacy, reviews evidence about educational attainment, the quality of the workforce and the economic value of literacy in Portugal, and explores policy options for ensuring that the supply of literacy skill meets expected levels of skill demand.

Economic theory backed up by a solid body of empirical evidence, reviewed in this report, suggests that human capital – the knowledge, skills and other attributes of people that can be put to productive use – is an important driver of economic growth and balanced social development, and that literacy is a key determinant of both human capital and social capital.

While literacy demand is driven by changes in technology and social organisation, literacy supply is determined by everyday reading practices and learning over the entire life course. Literacy demand and supply are matched in markets for skill that serve as the engines for creating skill-based social and economic inequality. These markets include labour markets, educational markets, health markets and the markets that provide access to power and influence in the broader society.

Until recently research relied on indirect measures of literacy skill, such as years of schooling and levels of educational attainment, to explore their relationships with individual and national economic and social outcomes. The availability of reliable direct measures of literacy skill allows for a more accurate exploration of the economic dimensions of literacy in Portugal.

Five findings crucially important for the country emerge from the analysis presented in this report:

- First, large differences exist in the level and distribution of literacy skills both within and between countries. Portugal displays among the lowest literacy skills of all countries sampled to date;
- Second, in most countries, differences in average literacy scores matter at the individual level because higher scores translate into improved educational access, more stable employment, better wages and health, and higher levels of social engagement. Portugal is an outlier in this respect since literacy scores have little impact on individual labour market success, except at the very highest level of literacy – a phenomenon thought to be a function of the low overall level of literacy skill and the low literacy intensity of most jobs in the country;
- Third, literacy-poor environments adversely influence the performance of social and economic institutions such as schools, community organisations and firms;

- Fourth, literacy matters at the macro-economic level. Differences in population literacy scores across OECD countries explain fully 55 per cent of the differences in the long-term rate of GDP growth per capita at the national level. Having a high proportion of adults with low literacy scores therefore constrains economic growth in the long term. In a separate analysis of data commissioned by the Portuguese Ministry of Education (Coulombe and Tremblay, 2009), the literacy skill gap of Portuguese labour market entrants relative to 14 other OECD countries accounts for 47.5 per cent of the gap in real per capita GDP between Portugal and the OECD average. The remaining part of the per capita GDP gap between Portugal and the OECD average is accounted for by the relative lack of physical capital, a lower employment rate and a technology lag;
- Finally, improved levels of adult literacy scores in the population should yield significant economic and social benefits to Portugal but realising these will depend on the successful implementation of active measures to foster the demand for literacy skills in the economy and society.
- The findings underscore the fact that Portugal should worry about the economics of literacy, for at least three main reasons: First, because of the influence it exerts on the capacity of the economy to create wealth; second, because the lack of literacy generates undesirable levels of inequality in valued outcomes such as education and health; and third, because low literacy reduces the efficiency of public investments made to provide goods and services to adults with low levels of skill.

The National Reading Plan, launched in June 2006 by the Portuguese government to promote reading in schools, public libraries and other social organisations, is a crucial element of the national effort to improve the supply of literacy skill in the country, and therefore should be afforded sustained political and financial support. The National Reading Plan is likely to have a beneficial impact in due course, but it needs to be complemented by a concerted effort to also improve the quality of initial schooling and to build up an effective system of adult education and training with incentives adequate to attract the many Portuguese adults who missed out on educational opportunities early in life. Improving the supply of literacy skill is one, albeit important part of the equation. The other is improving the demand for literacy skill in the Portuguese economy and society. Recognising, validating and rewarding skill in the labour market is therefore a large challenge for the country.



Foreword

Today Portugal stands at a crossroad. In the past successive governments were slow in expanding educational access and improving the quantity and quality of educational output. Under-investment in human capital has accumulated over the years with the result that current adult literacy levels are among the lowest in the OECD area.

This report argues that recent changes in the structure of the global economy have served to greatly increase the demand for literacy skill and hence the negative economic consequences that are associated with having skill levels below those of other countries. But recent investments in basic and upper secondary education in Portugal do not appear to be yielding the needed gains in literacy skill in part because of comparatively poor student achievement in reading literacy by the end of compulsory schooling and also because of the relatively small size of graduating cohorts and low levels of participation in tertiary education. Similarly, recent investments in adult education and training do not appear to be of a scale sufficient to yield the desired across the board increase in literacy skill.

The conclusion is that a much higher level of investment in both initial and adult education is called for if Portugal is to improve its human capital stock more rapidly than competitors on international markets. Crucially important are the extension of pre-school education to all four and five-year-olds, a programme already being implemented in Portugal, and the National Reading Plan, which mainly promotes reading on a daily basis among children in pre-schools and the first six years of basic schooling. But in addition to measures taken to improve the quality of compulsory education and reduce the number of early school leavers, concrete steps must be taken to build literacy rich environments at home, at work and in the community at large, so that the available supply of skill can be utilised.

It is unclear, however, if the current levels of investment will serve to increase literacy levels rapidly enough to support the productivity growth the country needs. This is so because the size of the investment necessarily depends on the current skill levels of the Portuguese workforce and on the current structures of the labour market and the economy. Bringing about change, therefore, will come at a high investment cost that will necessitate a tremendous and sustained national effort. Failure to invest sufficient funds upfront is likely to leave Portugal facing years of reduced GDP growth rates and high inequality in valued outcomes such as health, employment, education and social engagement.



T. Scott Murray
Director DataAngel

Introduction

This report is predicated upon the assumption that literacy – the ability to understand and apply information derived from print and other media – will play a central role in determining Portugal’s relative economic success over the coming decades. The document is designed to provide non-technical readers with an understanding of why this should be so and whether current levels of investment in human capital will precipitate the rapid rates of improvement in literacy skill that will be needed to improve competitiveness and support sustained economic growth in Portugal.

Chapter 1 contains the introduction to the report.

Chapter 2 provides a summary of the economic theory that identifies literacy as economically important. This information is critical to establishing why the National Reading Plan and recently introduced education reforms designed to improve the level of qualifications and competencies of the Portuguese population are central to the country’s future. The evidence indicates that literacy currently has little economic value in the country’s labour markets and that low literacy levels have constrained macro-economic growth over the years.

Chapter 3 reviews evidence from the research literature about the influences literacy exerts on individual labour market, health, educational and social outcomes. The results presented leave little doubt that literacy matters both economically and socially. Individuals with higher literacy scores work more, are richer, healthier and participate more often in the democratic process.

Chapter 4 summarises what is known in the literature about how – and the extent to which – adult literacy conditions the macro-economic performance of nations. The available evidence suggests that higher average levels of literacy precipitate significantly higher levels of productivity and GDP growth over the long run. Moreover, rates of productivity and GDP growth appear to be reduced in countries with large proportions of low-skilled workers.

Chapter 5 presents an overview of Portugal’s recent efforts to increase educational access, including for adults, and improve the quality and quantity of initial education. The findings do not paint a rosy picture. Because of under-investment historically the population has a low level of educational attainment and the quality of the workforce measured on adult literacy scales is low compared with OECD countries. Changing this rapidly is near impossible because the size of incoming cohorts of graduates is shrinking, the upper secondary graduation rate is still far from universal, access to tertiary education remains restricted and unequal, and performance on standardised tests of student achievement still leaves much to be desired.

Chapter 5 also analyses the quality of the current Portuguese workforce by examining the level and distribution of literacy skills. The findings clearly document the comparatively low average level of literacy skills in the population as well as the large score differences that exist between sub-populations – clear evidence of large inequalities in literacy levels in Portugal. The relationship between literacy levels and earnings from work reflects these inequalities. Partly because a very high proportion of jobs in Portugal are low skilled the relationship between literacy and wages is weakly negative for those with low and medium levels of literacy. In Portugal literacy skills matter economically only at the top end of the wage distribution. These results make it absolutely clear that policies and programmes designed to increase the supply of literacy skill and reduce social inequality in literacy, such as through the National Reading Plan, are desperately needed. But such policies must be accompanied by measures to augment labour market demand for literacy skills.

Chapter 6 analyses the supply of and demand for literacy skills in more detail. It first considers the trend towards a growing demand for skill in the Portuguese labour market. Comparative data are then used to examine the supply of literacy skills by population sub-groups. Third, the interaction between the demand for and supply of skill is studied in order to assess the extent of match and mismatch on the Portuguese labour market. The empirical results show that three-fifths of workers in Portugal are in low-skill equilibrium. The findings underscore the urgency of the need to deploy active adult learning strategies that reach out to the low skilled in the country. The prospects in this respect are not entirely encouraging, however, as additional evidence presented in the chapter shows a low adult education participation rate, a low level of engagement in reading at home and at work, and a low score on measures of social capital that play an instrumental role in the production of human capital.

Chapter 7 presents the conclusions and discusses some implications for policy. Increasing the level of skill in the entire population will require adequate investment over the long term in all components of the lifelong learning system. This not only calls for the education reforms currently being implemented (Ministry of Education, 2007), such as the provision of universal access to quality pre-school education for four and five-year-olds, improved teaching and learning conditions and increased time-on-task in basic education, expanded enrolment in general and vocational upper secondary education programmes, and increased access to tertiary education, particularly non-higher post upper-secondary education. Crucially, in addition to measures taken to improve the quantity and quality of initial education, Portugal needs a much more active recurrent education and training policy aimed at the general adult population. This should be accompanied by efforts to build literacy-rich environments at home, at work and in the wider community. The recent implementation of the National Reading Plan and other reforms is evidence that Portuguese politicians and policy makers appreciate these facts.

Data source tables and references are provided in appendices.

The Economics of Literacy: Theoretical Perspectives

Why worry about the economics of literacy? In a word – “change”. Change is a defining feature of modern life in today’s global economy. Technologies change, the organisation of work changes, terms of trade change, communities change and social roles change as individuals negotiate the life course. Change is unavoidable. It obliges individuals, social institutions and nations to adapt. Individuals and institutions that have the ability to adapt are resilient – they survive and have the chance to flourish. Individuals and institutions that lack the ability to adapt become vulnerable and dependent.

The ability of societies and economies to adapt to change depends, among other things, upon the skills that individuals, social institutions and nations possess. Literacy has been recognised as an important economic and social asset for at least 3200 years (Statistics Canada and HRDC, 1996)¹. Thus, self-interest suggests a need to understand how literacy will influence the lives of Portuguese citizens in the future and how parents, learners, citizens and employees need to respond to global and regional changes in the demand for literacy.

Literacy – its average level as well as population distribution – has played a central role in generating the economic wealth that allows citizens in many OECD countries to enjoy among the highest standards of living in the world. While Portugal was among the first nations to adopt a policy of universal primary education, the country has since been slower than most in raising secondary and tertiary graduation rates.

Recent evidence suggests that literacy will become an even more important determinant of economic and social progress as the structure of the global economy evolves. For this reason policy makers and politicians need to devote attention to literacy.

Low literacy levels have been responsible for creating much of the social inequality seen in many of the outcomes Portuguese citizens value most – good physical health, ability to access learning opportunities, confidence to participate socially and democratically, and the chance to enjoy stable, high wage employment. The efficiency of Portugal’s public good markets – labour markets, health systems, learning systems and political systems – is seriously constrained by the low average level of literacy and the high levels of social inequality in its distribution.

1. As evidenced by the papyrus from 1210 BC Thebes, reproduced in the Foreword of *Reading the Future: A Portrait of Literacy in Canada* (Statistics Canada and Human Resource Development Canada, 1996).

Literacy also plays a central role in determining the efficiency levels of taxes and what is received from the activities of governments. The demand for, and the cost of, providing public goods and services, including health and educational services, would be much reduced if literacy levels were higher.

Worrying about the economics of literacy is also pragmatic. Like it or not, economics dominates the public policy process in most countries, including in Portugal. Thus, to be successful, the moral imperative for public investments in literacy must be buttressed with economic arguments.

2.1 Literacy Definition

Reduced to its simplest the economics of literacy has to do with *human capital*, defined as the knowledge, qualifications, competencies and other qualities possessed by individuals that can be put to productive use (OECD, 1998). Literacy skill – the ability to use information derived from print to solve problems – has long been considered one of the key elements of human capital.

In theory, literacy influences broadly defined economic outcomes at three levels: the individual; the social, such as schools, communities and firms; and the macro level of economy and society. The presence of positive impacts at one level does not necessarily imply positive impacts at higher levels. For example, labour markets might reward workers with higher literacy skill by assigning them to higher wage jobs but this might not serve to increase the profitability of the firm for which they work nor the overall economic performance of the economy.

2.2 Economic Theories

The search for the determinants of differences in living standards across economies in the long run can be traced as far back as Adam Smith, one of the first economists to discern the impact of what people know and can do on economic growth (Smith, 1776). Research has led to the elaboration of several competing theories, including the neoclassical growth theory (Solow, 1956), endogenous growth theory (Romer, 1986), social investment theories (Hall and Jones, 1999), the entitlements work of Sen (1980), and the livelihoods framework elaborated by Cameron and Cameron (2005).

These theories matter because the evidence flowing from them exerts a profound influence on what public policy makers think is important and on where they chose to invest their limited public resources.

Macroeconomic models, including the endogenous growth models, have consistently yielded estimates of the returns to human capital that are far below those estimated at the individual level using data on the impact that educational attainment, years of schooling and experience have on wages and employment.

Economic policy makers have long assumed that the macro models have been right. This assumption has recently been called into question by economists who argue that measures of educational attainment, years of schooling and labour market experience fail to capture much of the individual-level variance in human capital, with the result that the impact of other inputs are over-estimated (Krueger and Lindahl, 2000; Hanushek and Zhang, 2006).

The first empirical treatments of the subject, however, did not appear until the late 1950s when Robert Solow (1956) elaborated the key tenets of the neoclassical growth theory. According to the early neoclassical model economic growth was driven by the improvement of productivity through technological advances determined outside the model (i.e., exogenous).

Neoclassical growth models treat human capital as an investment good in much the same way as a farmer might consider investing in tractors, a fisherman in boats or a logger in skidders. And, just as there are diminishing returns to a farmer buying more and more tractors, these models hold that there are diminishing returns to human capital accumulation. Suppose a country devotes a fixed 10 per cent of its GDP each year to accumulating human capital. More human capital means the country can produce more output, which means that more is spent on human capital, which leads to more output, and so on. However, the country gets less and less return for its additional investment in human capital at each iteration, until the process slowly stops some years later at the steady state level of human capital investment (and the steady state level of GDP). If the investment rate were to increase from 10 to 12 per cent then the process of human capital accumulation and increases in GDP would crank up again and continue until the country reaches a new steady state of human capital investment (and GDP).

In 1960, Gary Becker proposed an alternative theory that suggests that economic growth depends on a range of inputs, including physical capital, financial capital and human capital (Becker, 1964). Over the past 50 years, many of the key tenets of human capital theory have been empirically confirmed – human capital does matter to growth (Becker, 1964; Schultz, 1963; Mincer, 1974) – but striking contradictions and counter-intuitive results also emerged.

Although appealing, Solow's model could not be tested due to the lack of reliable data. In the late 1980s with internationally comparable data on income and price levels available (Summers and Heston, 1988), and the emergence of the endogenous growth models, it became possible to test the various models empirically.

According to Coulombe, Tremblay and Marchand (2004), the endogenous growth models were pioneered by Romer (1986) and Lucas (1988), being the first to focus on the long run, dynamic relationship between human capital and technological progress, using models where the long run growth rate of productivity emerged endogenously from the model variables.

Endogenous growth models make much more of the role of human capital, and consider the accumulation of knowledge and skills to be quite different from the accumulation of physical capital. In particular, they assume constant or increasing returns to investment in human capital. Consider again the country that devotes 10 per cent of its GDP each year to accumulating human capital. As the country gets richer it devotes more to human capital, which in turn continues to increase output, and so on, indefinitely. In endogenous growth models, human capital accumulation leads to a sustained increase in GDP, that is, to sustained economic growth in the long term. Increasing investment in human capital to 12 per cent of GDP would give an even larger boost to this continuing virtuous cycle of growth.

Temple (2000) provides an excellent review and discussion of empirical work on economic growth. Dowrick (2003) discusses features of endogenous growth models that generate constant or increasing returns to human capital investments. Cross-country growth regressions constitute a relatively new field of study in economics, having only been conducted over the past 15 years. Studies typically try to explain

countries' growth experiences from 1960 onwards, either using a large sample of countries or, less often, a sample of OECD countries. Some studies use a formal framework derived from one of the theoretical growth models as discussed above but others use more or less *ad hoc* specifications. Almost all cross-country studies include some measure of human capital in their regressions, most commonly school enrolment rates or the average years of schooling in the working-age population.

Hanushek and Kimko (2000) and Barro (2001) depart from the norm by using the results of international tests of student achievement conducted from the 1960s to the 1990s. In these models a more educated and literate population is more likely to invent (or import from other countries) improved methods of production, so that more output can be produced with the same quantity of inputs driven by a population with higher levels of human capital. This creates the possibility, absent from neoclassical models, of higher *levels* of human capital leading to higher *growth* of output per worker. Economic growth theories have widely posited an important role for education as the key system for generating human capital and literacy, although the exact way that education is seen as improving growth has varied. A more literate population may be much better equipped to adopt new technologies.

Yet empirical studies of income differences between countries conducted through the 1990s appeared to support the neoclassical models as synthesised in the work of Barro and Sala-i-Martin (1995). However, the basic Solow model had to be refined in order to be able to explain quantitative cross-country differences in living standards. Most importantly, the concept of capital had to be extended to account for human capital (Mankiw, Romer and Weil, 1992).

Baumol (1986), using data on a group of countries belonging to Maddison's (1982) sample, was among the first to confirm the absolute convergence of growth rates across countries. However, because the countries included in the sample belonged solely to a group of countries that had been able to achieve a high level of development by the end of the study period, definitive conclusions could not be drawn about the growth processes in all countries.

The international data set of Summers and Heston (1988) was the first to provide a larger sample of countries, including both rich and poor. These data allowed macroeconomists such as Romer (1989) to specify further models and conclude that absolute convergence did not hold over a larger and heterogeneous sample of countries. More precisely, Romer found that there was no significant correlation between initial income levels and subsequent growth rates.

Building upon Baumol's and Romer's empirical results, Mankiw, Romer and Weil (1992) modified the early neoclassical Solow model to allow for the accumulation of human capital, thereby introducing the notion of conditional convergence. Cross-country regressions led them to conclude that, instead of reaching a common steady state, each country reached its own equilibrium due to differences in rates of investment, rates of population growth and in stocks of human capital that all condition a country's steady state. In the "augmented Solow" model of Mankiw *et al.* (1992), education is incorporated as a form of capital in the production function. As with physical capital in the neoclassical model, an increase in the stock of literate adults leads to a one-off *ceteris paribus* increase in a country's level of output per worker, but with no long-run impact on economic growth.

However, in the context of neoclassical economic models the long run may refer to a period of several decades in which all other factors adjust to the new literacy level. The economic short run, during which the economy shifts to a new equilibrium

with other factors remaining constant, is favoured as an approach by many economists seeking to inform policy making.

Since the work of Mankiw *et al.* (1992), the concept of conditional convergence has been repeatedly confirmed in cross-country and panel data analysis. According to Glaeser *et al.* (2004) two competing economic theories have emerged as front runners – a theory that posits that human capital accumulation is the most important (Mankiw, Romer, and Weil, 1992, and Barro, Mankiw, and Sala-i-Martin, 1995, *inter alia*), and a theory that suggests that institutional improvements and investment in social infrastructure are driving growth (Hall and Jones, 1999).

2.3 Economic Frameworks and Literacy Theory

The economic theories reviewed above have been called into question by other theorists who have attempted to link economics to broader theories of development. These include Sen's framework of entitlements, capabilities and functionings (Sen, 1980) and Cameron and Cameron's (2005) livelihoods framework, as outlined below.

Sen's (1980) conceptual framework combining entitlements, capabilities and functionings has been proposed as an alternative economic framework for thinking about human capital and literacy. The framework originated in research into the social causes of famines in the 1970s, and blossomed into a general approach to human development in the 1980s and 1990s (see Gasper and Cameron, 2000).

Cameron and Cameron (2005) provide the following summary: "All people possess sets of rights and responsibilities that entitle themselves and others to portfolios of resources. Some entitlements rest upon individual property rights recognised in law, others may be received as public services (e.g. education), others may be guaranteed as access to common or pooled property by social conventions or membership organisations (e.g. forest or water user groups), and some may arise through trade and the actions of market forces. There are clear parallels here with the asset profile in the livelihoods framework. For vulnerable people, any entitlement may be enhanced or gained by improvement in an appropriate form of literacy. Multiple interconnected literacies in the law, advocacy for improved services, running of membership organisations, and dealing with merchants and/or moneylenders may all reduce vulnerability and improve economic well being.

Capabilities are enhanced when people gain skills they can use to employ their entitlements in new ways. Gains in factual, "banking" knowledge induced by joint literacy, education and vocational training programmes may enhance capabilities, though only in the weak sense of additional technical skills. All successful literacy programmes inevitably improve general skills in information collection, organisation, and storage. They may also have implications for modifying how people relate to each other in logical and emotional ways as aspects of communicative actions. Literacy interventions for adults are usually group activities, partially as a matter of simple economic, unit cost efficiency. Many literacy interventions (e.g., Actionaid's REFLECT) make an explicit social virtue out of creating groups and emphasise improving social relationship capabilities. Other interventions passively accept the economic logic institute a didactic, classroom style familiar from conventional schooling, and do little in increasing capabilities. The degree to which an explicit objective is to improve interactive capabilities may have implications for the types of economic activities that a literacy intervention may stimulate.

Functionings in the Sen framework are what people actually decide to achieve by using their time, energy and capabilities. They are revealed in the activities observed to calculate rates of return to a literacy gain or to describe a change in livelihood profile arising from a literacy intervention. The links between capabilities and functionings reveal the real choices and freedoms that people possess. A literacy intervention may increase the range of its participants' capabilities and be judged as successful in this respect, but the participants may feel they have no choice but to continue with the same pattern of functionings. There is an issue of agency involved, with a very strong social dimension. Feminist research has identified stages in empowerment that include self-valuation, valuation in immediate, familial/clan relationships, activity in more formal organisations, and collective achievements in structural change. A literacy programme is arguably incomplete as a socio-economic intervention if it does not assist its participants through all these stages and finally improve their foundational entitlement profiles. The economics of literacy should be very much concerned with processes by which people negotiate with powerful "outsiders" and claim entitlements to resources, and sees a responsibility for literacy interventions in building appropriate deliberative literacy capabilities and facilitating the development of organisational forms in which those acquired literacy skills can be expressed."

The livelihoods framework is a commonly used bridge between economics and wider development studies, and, according to Cameron and Cameron (2005), is broad enough to encompass some of the complications that are ignored in more conventional cost benefit analysis. The framework has also recently risen in prominence amongst development agencies as a way of connecting literacy to the wider context of the lives and aspirations of poor people (e.g. DFID, 2002). In the livelihoods framework, all households are seen as utilising changing patterns of natural, produced, human, financial, and social wealth to create livelihoods:

- people can also develop their capabilities into skills whose expression over time as human wealth is both means and end to long term development;
- the relatively modified physical environment is a reservoir of natural wealth important to human well-being in itself and capable of self-development;
- human activity in the natural environment can generate produced wealth, such as equipment and cooking utensils, that has a physical life and productive potential beyond immediate human consumption;
- some wealth is held in financial forms as money or near money, such as jewellery, due to properties of liquidity and high fungibility with other forms of wealth; and
- societies have collective histories of building trust, confidence and mutual security into relationships that constitute a social wealth.

The framework becomes a behavioural theory when it proposes that most people utilise their assets to reduce vulnerability and increase certainty as coping strategies seeking sustainability. Only a few can afford to take risks and seek to accumulate. The focus in most livelihoods monitoring by literacy researchers is how a literacy gain improves vulnerable people's capabilities to manage their livelihoods in a very challenging global economy.

Literacy interventions can be linked to this framework through a matrix that considers each asset in itself and allows considerations of paired relationships (see Table 2.1). The fifteen linkages implied in Table 2.1 are sufficient to show the

astonishing range of ways in which literacy can improve economic livelihoods in theory, and lack of knowledge of how literacy interventions do this in practice.

TABLE 2.1

Livelihoods framework for monitoring the impact of literacy interventions

	Social	Financial	Produced	Natural	Human
Human	More effective and transparent principal/agent relationships	Insurance and income smoothing, higher remittances from migration	Safe and efficient use	Claims to ownership/control of natural resources plus better health	Income raising vocational skills and more cost-effective schooling of next generation
Natural	Effective natural resource user groups	Mortgage indebtedness management	Environmental sustainability	Improved fertility and lower degradation/pollution	
Produced	Group sharing/leasing/hiring arrangements	Investment financing	Technological innovation with accurate specifications		
Financial	Micro-credit group stability	Cash flow management			
Social	More effective co-operation for advocacy and fairer competition				

Source: Cameron and Cameron (2005).

According to Cameron and Cameron (2005) each of these linkages can be examined in terms of whether it works to improve livelihoods through either market force or political advocacy. They also can be disaggregated for gender, social status, and disability analysis.

2.4 Theories of Literacy Supply and Demand

Each of the theories presented above embody an economic model of skill that includes elements of skill demand, skill supply and markets for skill. As illustrated below, adopting such a model allows one to profile the nature of skill supply and demand at any given point in time and to undertake analyses of how skill demand and supply are likely to evolve over the short and medium term. The assumption is that different life contexts – work, home and the community – impose skill demands on individuals. The type of skill required, its level of difficulty, and the degree to which it calls for practical, crystallised, fluid or creative solutions can characterise these demands.

Individual proficiency can be characterised along the same dimensions and can be assigned a probability that reflects the likelihood that an individual will be able to master tasks in any given domain. In international literacy assessments such as the International Adult Literacy Survey (IALS) and the Adult Literacy and Life Skills survey (ALL), the skill supply was defined as that percentage of individuals who have an 80 per cent or greater probability of getting tasks at a given level of difficulty correct in a particular skill domain.

The economic model also allows one to gauge the efficiency of the markets that match the available supply of economically and socially important skill to current demand and to identify how skill influences the level and social distribution of key economic, social, educational and environmental outcomes at the level of the individual, social institutions and nations. The link of skill to outcomes is what attracts the interest of policy makers. This link allows them to identify and characterise the nature of any skill deficits and to understand how it influences the overall level of human development (OECD and Statistics Canada, 2005).

The utility of any theory will depend, in large measure, on its relevance in focusing on change. In the present context a focus on change allows public policy makers to understand the rate at which skill supply profiles are evolving globally; the social and economic forces that underlie observed change in literacy skill supply and demand; the impact that supply and demand changes will have on the overall level of key outcomes; how these outcomes are distributed socially; and, most importantly, some sense of the scope of public policy to influence the level and distribution of skill supply, skill demand, and the efficiency of the markets that match supply and demand.

In the skill framework that underpins the IALS and ALL studies, changes in skill demand can be traced to two sources – externally imposed changes and internally imposed changes. Externally imposed changes in skill demand are the result of changes in the technology and organisation of work, consumer markets and social institutions. These changes include the diffusion of new technologies, process innovations and the reconfiguration of social institutions. While there is a consensus that literacy skill demand is rising in all life contexts – work, home and the community – this rise is the product of offsetting processes of de-skilling and up-skilling. Internally motivated changes in skill demand flow from two sources – first, changes in individual and collective goals and aspirations, and second, changes that can be thought of as the natural consequence of an individual’s passage through different life stages.

Change in the supply of economically, socially and environmentally important skill is the result of shifts in the demographic composition of populations and changes in the social systems that support skill acquisition and maintenance over the life course. Reform to improve the quantity and quality of pre-school, primary and secondary education is the most obvious instrument to effect change in the supply of skill. Analysis of IALS and ALL data suggest, however, that other factors also play a significant role in skill acquisition and maintenance (OECD and Human Resources Development Canada, 1997). The level of socio-economic development, the level of participation in tertiary education and its quality, the level of participation in adult education and training and its quality and the intensity of literacy skill use on the job all appear to have a marked positive impact on the supply of skill and its average quality.

In sharp contrast, the available empirical evidence also suggests that some of the population skill gains being realised over time through improved initial education are being offset by skill losses in adulthood. This skill loss appears to be related to variation in the actual use of skills in various life contexts that, in turn, seem to reflect differences in the social and economic demand for skill. Culture also seems to play a role in that countries differ greatly in their participation in lifelong learning and in their levels of skill use outside of paid employment. The magnitude of skill loss observed in Canada, for example, has been large enough to offset all skill gains from rising initial educational quality and quantity and higher rates of adult education and training (Willms and Murray, 2007).

Skill loss is a matter of urgent public policy concern. The spectre of large educational opportunity costs leads public policy makers to reflect on the need to balance supply-side interventions with measures that serve to increase the overall levels of demand for skill. The presence of skill loss also justifies the need for repeated measurement of adult skills. If initial education fixed skill for life then school-based assessments, such as the Programme for International Student Assessment (PISA) administered by the OECD, would be all that was required.

In the IALS and ALL frameworks, markets for skill are the mechanism by which supply and demand are reconciled. The notion of markets embodied in the IALS and ALL studies is broader than the traditional notion of markets for goods and services and labour. It includes markets for the provision of public goods and services such as health care and markets that involve the exchange of social goods and services such as unpaid work in the family and the community.

Although the variables are not perfect the empirical evidence suggests that markets for skill are reasonably efficient in most countries, in that national markets recognise and reward skill. This being said, the degree to which skill influences outcomes varies considerably from country to country, a fact that seems to reflect the relative balance of supply and demand for each skill.

Public policy may attempt to influence all three elements in the foregoing model; i.e., policy makers may try to influence skill demand by adopting policies that require skill intense technologies; they can influence the supply of skill by financing education provision; and they can increase the efficiency of the markets that select upon skill, including the labour market. The balance struck by government among these elements can have a profound impact upon the real and observed effects of literacy and other skills upon economic outcomes. For example, if the supply of literacy skill is adequate and reasonably uniform in level then literacy will have a low impact on wage rates, a signal that some economists misinterpret as literacy being economically unimportant.

2.5 Literacy and Theories of Skill

Skill has been considered in a generic, undifferentiated sense in the foregoing discussion. As illustrated in Figure 2.1, however, in the current research literature the concept of skill is much richer – it defines a set of distinct skill domains, interrelated and organised hierarchically, each of which has its own economic, social and educational value. These skill domains are identified and measured in the academic literature on human cognition and intelligence, the job and task analyses that underlie occupational skill standards, and the research literature concerned with the expected outputs and benefits of education.

Several aspects of the skill hierarchy shown in Figure 2.1 are noteworthy.

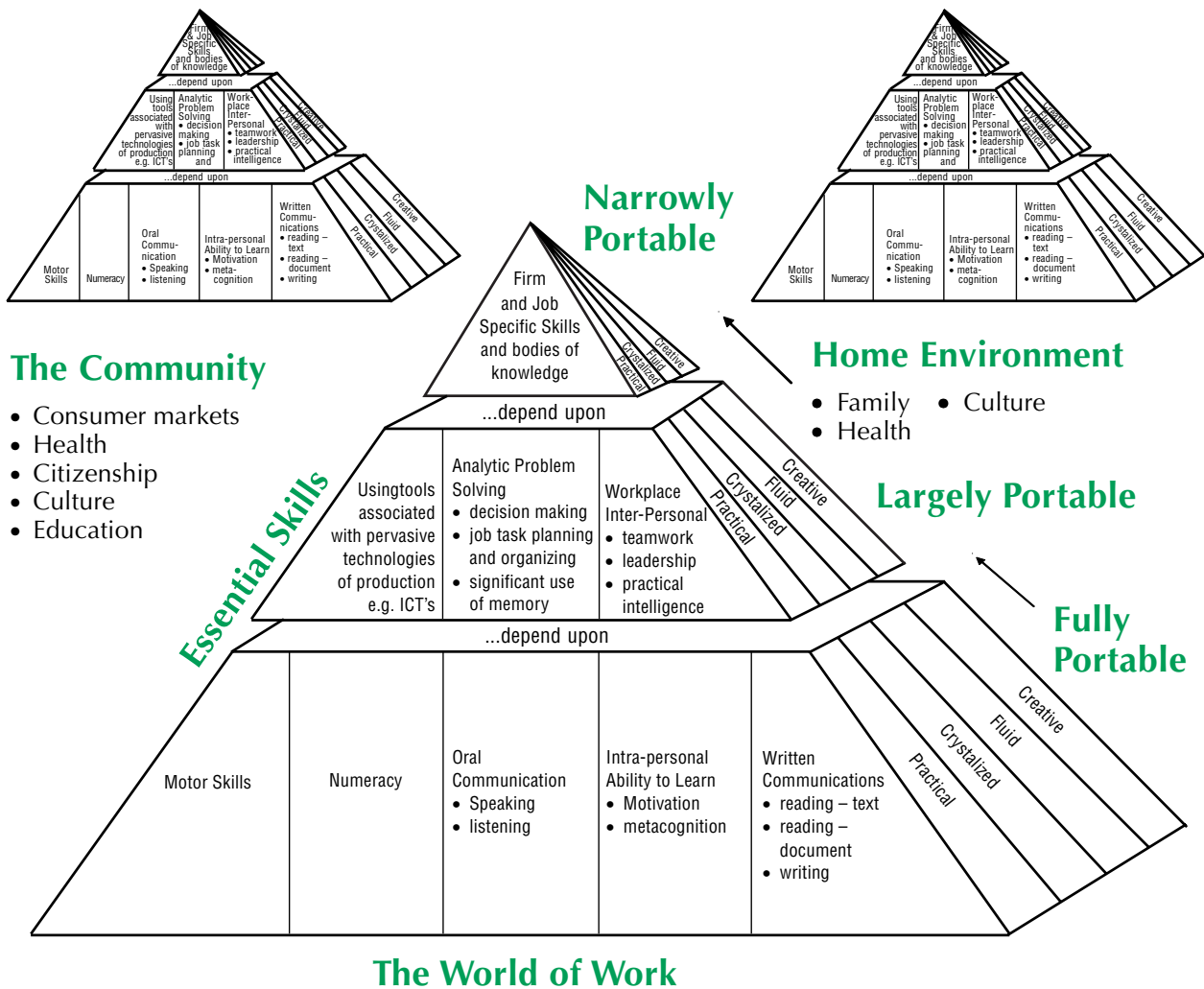
First, the levels in the pyramid are meant to convey the notion that skills at different levels are linked in specific ways – notably that skills at higher levels depend in some way upon skills at lower levels. One of the key objectives of the ALL study was to establish the strength of these dependencies empirically. Such dependencies are important for both policy and instructional design since they imply a hierarchy of need in which skills at the bottom of the pyramid would receive priority if one were concerned with reducing social inequities in outcomes that are attributable to social inequities in the distribution of skill. This policy emphasis would mean ignoring employers' calls for government investment in higher order skills such as team working and critical thinking that may be in short supply.

Second, the levels in the pyramid are meant to convey a sense of the portability, that is, the degree to which skills can be put to productive use in multiple contexts. Each of the skills measured by the ALL study is believed to be portable across a broad range of contexts. The portability of skill carries implications for policy. The more a skill is portable the stronger the case can be made that remedial intervention should be financed by government, the less portable a skill is the stronger the case for private finance.

FIGURE 2.1

Skill supply and demand in context

Hierarchy of general and specific skills identified in the research literature as important to the work place, the home environment and the community.



Source: Murray, Binkley and Clermont (2005).

Third, the pyramid shows four levels of performance that are identified in the research literature on human cognition. It is clear that the majority of individuals possess the practical and crystallised abilities to cope with most everyday skill demands. The approach to assessment applied in the ALL study concentrates on identifying skills that are associated with fluid and creative intelligence – the levels that are associated with efficient adaptation to anticipated changes in skill demand.

Finally, the fact that only some of the skill domains have been assessed creates problems for estimating the economic value of the skills that have been measured. If the unmeasured skills are correlated with what has been measured, great care has to be taken to avoid misattribution of variance. Green and Riddell (2007) deal with this problem explicitly in their analyses.

The next chapter will examine the individual economic outcomes associated with literacy skill.

Evidence on the Individual Outcomes of Literacy

Research studies have found that literacy skill exerts a profound influence over a range of important social and economic outcomes:

- labour market outcomes such as employment, wages, and reliance on social transfers;
- education outcomes, including persistence rates to secondary graduation and participation in post-secondary education and adult learning systems;
- health outcomes, including overall quality of life, mortality, and the public and private costs of health treatment; and,
- social outcomes, including levels of engagement in the community and in the broader democratic process.

The subsequent sections highlight what is currently known from the research literature about the impact of literacy in each of these areas.

3.1 Labour Market Outcomes

At the individual level literacy and numeracy skill can be viewed as productive assets that people bring to the labour market. It follows from labour market theory that skill will play a role in creating social inequality in economic outcomes. Current work organisations and technologies of production impose a set of skill demands, and employers recruit and reward employees according to their skill levels. In labour markets where one sees large differences in skill among individuals and different population sub-groups, workers with high skill tend to obtain stable, well-paid jobs while workers with low skill are excluded from employment or relegated to low skilled jobs, intermittent employment and low wages.

Several theories contribute to an explanation of the observed inequality in individual earnings. Some of these relate to each other and can be used in combination to add explanatory value. A useful starting point is the neoclassical economic framework described previously, in which it is implied that individuals who contribute more to the final value of production should also earn more. Complementing this is the theory of human capital (Schultz, 1961; Becker, 1962, 1964; Mincer, 1974), whose core premise suggests that the relative contribution of individuals depends on the knowledge, skills and other attributes embodied within them (Blaug, 1976).

According to Johnston (2004) most work at the individual level has attempted to estimate the private rates of return. The private rate of return to a particular level of education or literacy is defined as the discount rate that equalises the present value costs, including opportunity costs, of acquiring that level of education to the individual (often contributed by their family), with the present value of the increase in future income to the individual that results from being more highly educated.

A distinction needs to be made between private and social rates of return. Private rates of return refer to the costs incurred and benefits enjoyed by individuals and their households in obtaining more education (or literacy). Social rates of return depend upon the total costs to society of providing education and the total benefits that stem from having a more educated (or literate) individual in the population.

Gender often impacts on differences between private and social rates of return to education and literacy, with high social rates of return to educating girls primarily due to the effects on reducing fertility and health costs. In developing countries the returns to primary education are conventionally found to be very high, whether compared to other investments, or to investments in secondary or tertiary education. Typically, estimates of the social returns to education simply incorporate the total costs of providing education, and so are by definition lower than private returns, which exclude some of these costs. Measuring externalities – the positive benefits that the education and literacy of one individual may have for the economic situation of others – is complicated precisely because it relates to several of the endogenous livelihood-enhancing linkages referred to in the previous chapter. If literacy boosts national economic growth, then there are a number of channels through which this could improve the livelihoods of individuals, families or communities, although it is by no means assured that such improvements will appear. In the livelihoods framework this would depend on the linkages between human, natural, produced, financial, and social wealth.

Including some of these complications on the benefits side, insight can be gained from studies of positive externalities of literacy within households, based on the idea that more literate individuals may provide literacy services to less literate people in their society; services that raise incomes of less literate members. In livelihoods language this can be seen as a linkage between human and social wealth.

Labour economists have advanced several competing theories in their efforts to reconcile the available empirical evidence with the initial underlying theory. For example, the theory of labour-segmented markets, which was popularised by Doeringer and Piore (1971), has traditionally differed from human capital theory in terms of its focus. It has tended to emphasise the characteristics of jobs and job markets, rather than the characteristics of individuals (Duncan and Hoffman, 1979). The labour-segmented markets theory suggests that different labour markets operate under different circumstances such as regulations, technology, demand and supply, which leads to varying pay and benefits. Many proponents of the theory have suggested that worker productivity and pay are determined more by the job and its technology than by the human capital of the worker (Velloso, 1995). These conclusions are mostly based on studies that view labour-segmentation as a function of industry. In many such studies, job characteristics are not viewed from the point of view of the individual characteristics (i.e., human capital) needed to carry out occupational tasks.

In contrast, there are other studies (e.g., Osberg *et al.*, 1989, Raudenbush and Kasim, 2002) that have considered labour-segmentation as a function of occupation. This approach explicitly makes individual characteristics such as human capital

relevant, since they are needed to carry out the tasks of different occupations. Osberg *et al.* (1989) state that because of subcontracting and other developments, industry-based classifications of economic activity are becoming increasingly unreliable, and thus there is a need to emphasise the occupational composition of the labour force.

The latter approach to viewing labour-segmentation allows for the consideration of whether the returns to qualifications and skills vary by different types of occupations. Demand side data on occupational skill standards indeed identify substantial heterogeneity in the skill content of jobs (HRSDC, 2006).

Another important theory is signaling theory (Arrow, 1973; Spence, 1973; Riley, 1976; Weiss, 1995). Because employers have imperfect information concerning potential employees, such as their ability and future productivity, they face a dilemma when they are hiring. Therefore, they have little choice but to infer applicants' abilities to produce by relying on their qualifications that are validated and recognised, such as educational attainment. In short, the theory suggests that education acts as a signaling or screening device for unobserved characteristics. Even though education is only a proxy for human capital, it is vitally important by serving as a screening or filtering function. Indeed, there are findings (e.g., Black and Lynch, 1996: 266), which suggest that educational credentials are important to employers when hiring, and thus play an important role in providing access to occupations. Signaling will tend to reduce the observed economic returns to skill to the degree that educational credentials are only partially correlated with true skill.

Much of the research literature suffers from a common weakness – without direct measures of human capital they are constrained by the assumption that those with a specified level of education possess similar knowledge, skills and other attributes. The observed variation in wages within occupations is much larger than can be explained by differences in educational attainment. Such variation is undoubtedly the product of underlying variation in the degree to which firms employ and reward skill and in the actual skill levels of workers.

Neither the design of the IALS study, nor that of the ALL study, offers any insight into inter-firm heterogeneity with respect to skill utilisation and reward. These studies do, however, provide direct measures that allow for specific skills to be separately identified and valued from the many characteristics that education is supposed to indirectly measure. It also allows for an improved understanding of the correspondence between the inputs and outputs of the human capital formation process. If a particular skill is valued independently from schooling, then schooling may continue to function as a proxy for other unmeasured characteristics.

3.2 Level Effects on Employment and Wages

Green and Riddell (2001) adjust for literacy proficiency and educational attainment simultaneously using a Mincerian-type approach. They find significant returns to literacy proficiency in the Canadian labour market – about 3.0 to 3.5 per cent for every 10-point increase on the prose literacy scale.²

A more detailed analysis by the same authors (Riddell and Green, 2002) confirms this result and, moreover, establishes that the return to skills is more or less stable across the entire wage distribution. This suggests that skill makes a direct contribution to productivity rather than being simply an artefact of selection. Riddell and Green

2. These returns are for weekly log earnings.

(2002) also determine that literacy and numeracy skills explain a significant fraction of total wage variation once one has netted out the variation attributable to selection effects that tend to blur the relationship between wages and productive characteristics. This finding implies that the characteristics that remain unmeasured are less important in relative terms. While controlling for literacy proficiency, OECD and HRDC (1997) also find that the effect of education on earnings is reduced.

Riddell and Green (2007) have recently extended and refined these analyses for Canada using data from the 2003 ALL study. They confirm the existence of strong employment and wage effects for the labour market as a whole, for aboriginals and for immigrants. This latter finding is particularly important as it asserts that there is no evidence for systemic skill-based discrimination in the Canadian labour market.

Osberg (2000: 8) reports results indicating that 40 to 45 per cent of the economic return to education is attributable to literacy proficiency, which implies that education yields other economically important outcomes. Boothby has established that literacy skill attracts significant wage premia in jobs where incumbents are over and under-qualified, hence suggesting that literacy contributes directly to productivity (Boothby, 1999). Raudenbush and Kasim (2002) have established that wage premia accruing to literacy in the United States rise with the information and knowledge intensity of jobs. Finally, Shalla and Schellenberg (1998) cite research conducted by the National Anti-Poverty Organization (NAPO) that shows that Canadian working-age women and men who are economically disadvantaged and who possess weak literacy skills are doubly disadvantaged, and face a high risk of marginalisation. The interacting and compounding effects of low income and limited literacy could result in high social and economic costs to individuals and to society, especially under circumstances of economic restructuring and accompanying labour market changes.

It is clear from the body of evidence reviewed above that literacy and numeracy skill play a significant role in allocating employment opportunities and wages in relatively open labour markets in North America. These findings for North American labour markets are mirrored in similar analyses undertaken for many – but not all – other countries for which IALS and ALL literacy data are available. Wage returns to literacy skill in Sweden, for example, appear to be low in large measure because the quantity and quality of skill in the population is high overall and not very variable. As a result, Swedish employers are likely to assign wage differences based on other characteristics that contribute to productivity (OECD and HRDC, 1997).

Findings also suggest that returns to skill vary by occupation. Using the National Adult Literacy Survey (NALS) data, Raudenbush and Kasim (2002) apply a model of the labour-segmented information economy borrowed from Osberg *et al.* (1989) to explore the relationships among several social inequalities, inequality in literacy skills, and inequality in employment and earnings, both within and between occupational types. They associate “good” occupations with relatively well-paying information occupations. In their analysis, the average effect of literacy skills was approximately 25 per cent of the contribution of education to earnings. A one standard deviation increase in literacy proficiency was associated with an approximate 18 per cent increase in hourly earnings, but this varied by occupational type. For example, they find that in the US labour market the relationship between literacy skills and earnings is steeper in information occupations than in non-information occupations.

Using IALS data for the United Kingdom, McIntosh and Vignoles (2001) find that men with Level 2 prose literacy skills are 9.0 percentage points more likely to be employed than men with Level 1 prose literacy skills; the corresponding figure for women is 13.5 per cent.

North American studies indicate that an increase in literacy of one standard deviation increases the probability of employment by 2-4 per cent for men and by up to 8 per cent for women. Most studies find that the impact of literacy on employment is greater for women than for men. Pryor and Schaffer (1999) consider that this is because female labour supply is more sensitive to hourly earnings than male labour supply, and hourly earnings are positively related to literacy.

There are additional research studies that have used direct assessments of basic skills. For example, Murnane, Willet and Levy (1995) show that the knowledge and information intensity of occupations increased from the 1970s to the mid-1980s. In Murnane, Willet, Braatz and Duhaldeborde (2001) three types of skills are examined, namely academic skills, skills at completing elementary tasks quickly, and self-esteem, confirming the importance of basic skills in the labour market in the United States. Riviera-Batiz (1992), using the Young Adult Literacy Survey (YALS) data, shows that quantitative literacy also has an independent effect on earnings over and above the effect of initial education.

Evidence suggests that the returns to literacy skills can substantially vary between countries. For example, Devroye and Freeman (2001) conclude that the US labour market sorts people by literacy proficiency more than any other country. Blau and Kahn (2001) confirm this by suggesting that knowledge and skills play a significant role in explaining relatively high US wage inequalities but also find that the earnings benefits of literacy vary by country.

Leuven (2000) also finds that the relationship between initial schooling and cognitive scores is steeper in the US compared to other OECD countries. In contrast, Tuijnman (2000) finds that the Polish labour market pays for educational qualifications and for work experience but does not highly reward literacy skills. Analysis of the impact of literacy on wages in urban China suggests that the relationships observed in the economically developed countries are found elsewhere too (Giles and Zhang, 2003).

In many studies results differ between men and women although no obvious or consistent pattern emerges. In a review prepared for the New Zealand Treasury Department, Johnston (2004) reports on a range of studies, including an analysis of New Zealand IALS data by Maré and Chapple (2000), that shows that a 10 per cent increase in the average of the three literacy scores raises male annual earnings by 4.0 per cent and female annual earnings by 5.1 per cent. To look at the effect on earnings per unit of time, Maré and Chapple add controls for the normal hours each person works per week, weeks worked during the previous year, and whether people work full-time or part-time. They find, using these controls, that a 10 per cent increase in the mean literacy score increases male and female earnings by 5.0 and 3.2 per cent, respectively.

Also using IALS data, Denny, Harmon and O'Sullivan (2004) calculate the earnings benefits of literacy in 17 countries. Results differ considerably between countries, from a return of 1.3 per cent in Germany to 3.3 per cent in the Netherlands. In New Zealand, a 10 point increase in the average literacy score in IALS is associated with a 2.4 per cent increase in hourly earnings, results in the middle of this range.

The benefits of literacy also appear to change over time. Murnane, Willet and Levy (1995), for example, follow two cohorts of young people in the United States, separated by eight years. They find that the earnings premium associated with basic reading and mathematics skills, measured in the last year of high school, was much greater for the most recent cohort than for the earlier one.

In their review of the research literature, Cameron and Cameron (2005) report a broad range of results for both the developed and developing world. Boissiere *et al.* (1985) provide a rigorous study of the direct impact of literacy-derived cognitive skills. Their research with 384 individuals in Kenya and Tanzania enabled them to isolate cognitive skill gains and compare their impact on earnings to those from years of schooling (a proxy for a credentialist-screening factor) and differences in innate reasoning ability. They found: “The direct returns to reasoning ability in the labour market are small, those to years of education are moderate, and those to literacy and numeracy – dimensions of human capital – are large. The returns to cognitive achievement are not significantly lower for manual than for non-manual workers” (Boissiere *et al.*, 1985: 1028).

Psacharopoulos and Patrinos (2002) present international averages of 27 per cent for the private returns to primary schooling and 19 per cent for the social returns. For low-income countries, the private returns appear slightly lower (26 per cent) while the social returns are slightly higher (21 per cent) than the world averages.

Johnston (2004) concludes that, while they vary across studies, countries and times, the results of the different studies are reasonably consistent. Across the studies, a 10-point increase in literacy, on the 500-point IALS and ALL scales, results in an increase in earnings of around 1 to 5 per cent. According to Johnston (2004) a one standard deviation increase on a literacy test results in an increase in earnings of between 4 and 20 per cent.

By way of comparison, a year of schooling is typically associated with an earnings increase of around 7 per cent to 10 per cent a year – so the inescapable conclusion is that investments in literacy would pay important economic dividends – at least as long as the economy was able to put the additional skills to good use.

3.3 Distributional Effects on Employment and Wages

Studies typically model a linear relationship between log earnings and literacy, so that a 10-point increase in literacy scores will necessarily have the same percentage effect on earnings at high levels of literacy as at low levels.

Johnston (2004) summarises the studies that test for nonlinearity:

Maré and Chapple (2000) look at whether literacy has significantly larger earnings elasticity for people with low literacy skills but could find no support for this hypothesis. However, their logarithmic model specification does imply that a 10-point increase in scores at low levels of literacy will be more highly rewarded than a 10-point increase at high levels of literacy.

Rivera-Batiz (1990) finds that a quadratic term involving literacy has a negative sign (indicating a stronger effect at low levels of literacy) but that this is only marginally significant.

Denny *et al.* (2004) allow for non-linearity in their results by using dummy variables for each quintile of the IALS score distribution instead of the literacy score itself. They find that in New Zealand the biggest increase in earnings comes from moving from the first to the second quintile of IALS scores (i.e. at low levels of literacy). Other countries have different patterns of returns, however. In the United Kingdom, for example, the biggest jump in returns comes with moving from the fourth to the fifth quintile of literacy score.

Lee and Miller (2000) and McIntosh and Vignoles (2001) look specifically at the difference in earnings between people at various levels of literacy in IALS, although most of the coefficients reported in both these studies are not statistically significant, and should therefore be treated with caution. Lee and Miller (2000), using an Australian data set, report that the biggest increase in earnings for men comes with moving from Level 1 to Level 2, but that the biggest increase for women comes with moving from Level 4 to Level 5. McIntosh and Vignoles (2001) report, for the United Kingdom, that the earnings premium for being at Level 2 of the prose literacy scale compared to Level 1 is 11.5 per cent for men and 14 per cent for women. The premium for being at Levels 3-5 drops for men to 9.5 per cent but grows to 19.2 per cent for women.

Despite these issues surrounding estimation of returns to education, Harmon, Oosterbeek and Walker's (2003) recent review concludes that the effect of education on individual earnings is unambiguously positive, and large relative to returns on other investments. Similarly, Appleton and Teal (1998), reviewing evidence from studies incorporating previously omitted variables such as parental background and cognitive skills, suggest that the returns to human capital as conventionally estimated may be overstated, but not by very much.

In 2005, Canadian employees earned, on average, \$19.09 per hour before taxes and other deductions. Thus, a 10-point increase of average literacy scores would, all other things equal, increase average wages by 95 cents to \$20.04 per hour (Statistics Canada, 2005). In 2002, Canadians are estimated to have worked 27,230,341,000 hours, implying that overall earnings would have grown by \$25.9 billion or \$1,653 per worker (Statistics Canada, 2005).

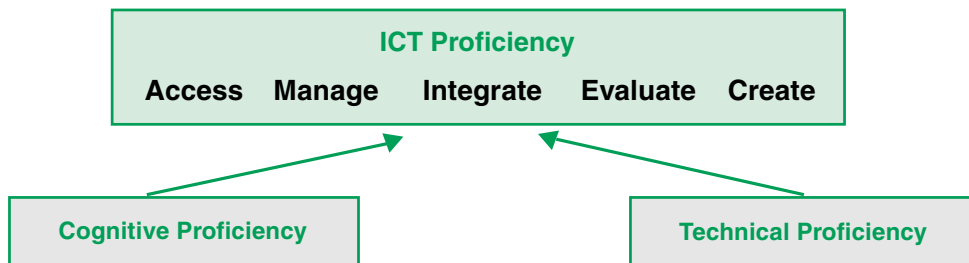
3.4 Information Technology Outcomes

The statement that labour markets in developed economies are undergoing a fundamental transformation as a consequence of technological change has acquired the status of accepted fact (OECD, 2003). The characteristics of this technological change vary from description to description but all have in common the claim that new technologies and forms of work organisation increase the knowledge and information intensity of jobs and thus favour more literate over less literate workers (Katz and Autor, 1999). Typically, the skills being referred to seem to be cognitive: the type useful in interacting with new information and communication technologies (ICT). However, a large body of empirical work suggests that non-cognitive traits explain more of the observed variation in earnings than do measured cognitive skills (Bowles *et al.*, 2001).

The measures of ICT skill embodied in the ALL study are based upon work done by Irwin Kirsch and colleagues at the Educational Testing Service (ETS). The ETS framework defines ICT skill as a combination of cognitive skills – literacy, numeracy and problem solving skill – and the technical skill associated with using a particular technology – its syntax, user interface, etc. Although proficiency depends on the application of both sets of skills, the relative difficulty of ICT skills is largely dictated by the nature of the tasks at hand. As illustrated in Figure 3.1 the ETS framework defines five ascending levels of application – access, manage, integrate, evaluate and create.

FIGURE 3.1

Framework for measuring ICT literacy proficiency



Source: Educational Testing Service (2003).

This framework allows individuals to be classified into four categories (Table 3.1), each of which carries different implications for remedial education required to use technology in the workplace. From an employer point of view workers classified in Group B are considered ICT literate and job ready whereas workers in Group A require technical training in the use of ICT. Workers in Group C require extensive literacy and ICT training. Very small numbers of workers are found in Group D – workers in this group are repetitive users of ICT that require little cognitive input.

TABLE 3.1

Classification of cognitive and technical proficiency

	Low Technical Proficiency	High Cognitive Proficiency
High Cognitive Proficiency	A	B
Low Cognitive Proficiency	C	D

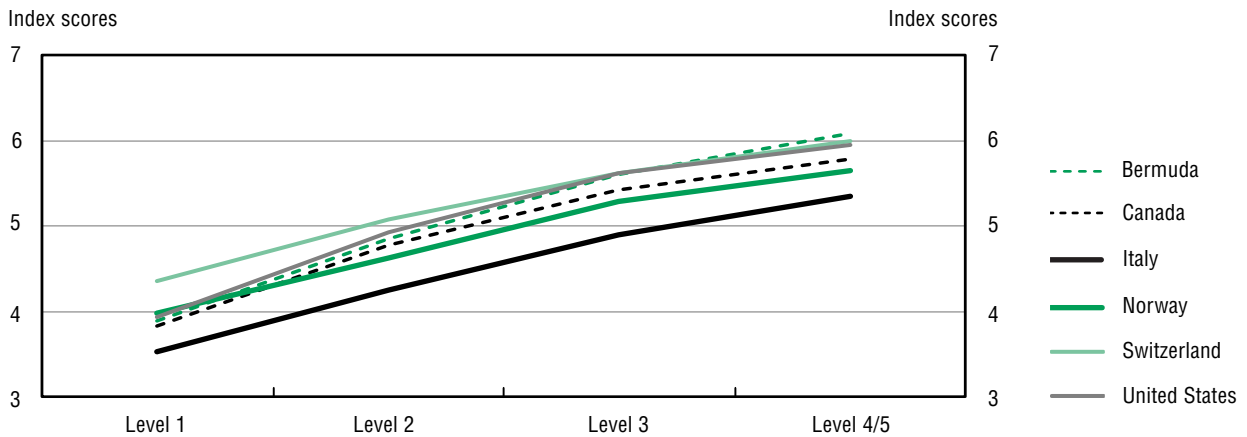
Source: Educational Testing Service (2003).

The ALL study carried a battery of questions designed to identify the incidence, frequency and range of ICT use at work and in daily life (see Text Box 3.1). The questions were used to create a pair of composite ICT indices. Figure 3.2A confirms the existence of a strong association between literacy skill and ICT use for a range of countries.

FIGURE 3.2A

Use of computers for task-oriented purposes by literacy skills

Mean index scores on a scale measuring the intensity of use of computers for specific task-oriented purposes, by prose literacy levels, populations aged 16 to 65, 2003



Source: Adult Literacy and Life Skills Survey, 2003.

Box 3A

Indices of ICT use and familiarity

Three indices of ICT use and familiarity were derived from several observed variables that were collected in the ALL survey. ICT related variables were examined using Exploratory Factor Analysis with principal components specified as the method. Confirmatory Factor Analysis was then used to validate three models that were hypothesized on the basis of the exploratory results and an interpretation of the observed variables. Index scores were derived according to the specified models using a Rasch scaling approach. Scores for each index are expressed as standardized scores on a 10-point scale, with a mean of 5 and a standard deviation of 1.5.

The underlying variables used to construct the three measures are outlined below:

1. Index of perceived usefulness and attitude toward computers

Please tell me whether you strongly agree, agree, disagree, or strongly disagree with each of the following statements:

- Computers have made it possible for me to get more done in less time
- Computers have made it easier for me to get useful information
- Computers have helped me to learn new skills other than computer skills
- Computers have helped me to communicate with people
- Computers have helped me reach my occupational (career) goals

2. Index of diversity and intensity of Internet use

In a typical month, how often did you use the Internet for the following purposes? (Daily, a few times a week, a few times a month, never)

- Electronic mail (email)
- Participate in chat groups or other on-line discussions

- Shopping (including browsing for products or services but not necessarily buying)
 - Banking
 - Formal education or training (part of a formal learning activity such as a course or a program of studies)
 - Obtain or save music
 - Read about news and current events
 - Search for employment opportunities
 - Search for health related information
 - Search for weather related information
 - Search for government information
 - Playing games with others
 - General browsing
 - Other purposes; specify
 - In a typical month, how many hours did you use a computer at home?
3. Index of using computers for task-oriented purposes

In a typical month, how often did you use a computer for the following purposes? (Daily, a few times a week, a few times a month, never).

- Writing or editing text
- Accounts, spreadsheets or statistical analysis
- Creating graphics, designs, pictures or presentations
- Programming or writing computer code
- Keeping a schedule or calendar
- Reading information on a CD-ROM or DVD
- In a typical month, how many hours did you use a computer at home?

Figure 3.2B shows that literacy impacts not only the incidence of ICT use but also the intensity of ICT use. This relationship is particularly important given that the intense application of ICT is believed to be one of the key ways in which OECD economies will be able to remain competitive. The intense use of ICT will allow firms to become more productive through the adoption of more efficient technologies of production and work organisation. Only those countries with highly literate workforces will, however, be able to achieve rapid enough rates of diffusion. Portugal is not currently among this group of countries.

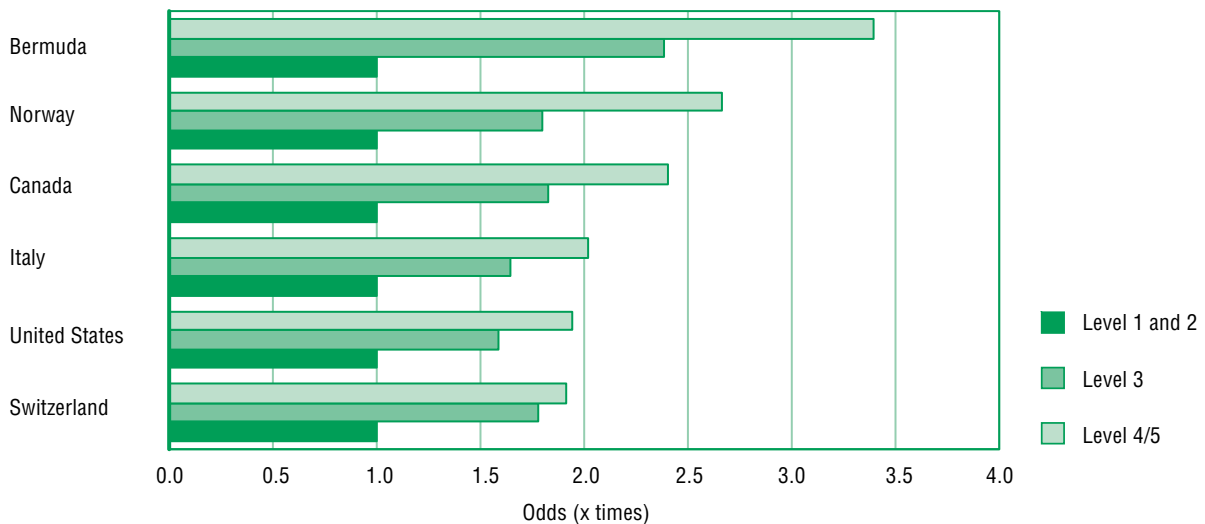
Box 3B**Measuring combined literacy skill and computer use profiles**

The logistic regression in this section models the effects of various socio-economic characteristics, as well as combined literacy skill and computer use profiles, on personal income. The combined profiles consist of four groups as follows:

Profile	Literacy level	Use of computers for task-oriented purposes
Group 1	Low (Levels 1 and 2)	Low-intensity (< top quartile of computer users)
Group 2	Medium/high (Levels 3 and 4/5)	Low-intensity (< top quartile of computer users)
Group 3	Low (Levels 1 and 2)	High-intensity (top quartile of computer users)
Group 4	Medium/high (Levels 3 and 4/5)	High-intensity (top quartile of computer users)

FIGURE 3.2B**Likelihood of being a high intensity computer user by literacy skill levels**

Adjusted odds ratios showing the likelihood of adults aged 16 to 65 of being high intensity computer users, by prose literacy levels, 2003



Countries are ranked by the odds of those who score at Level 4/5.

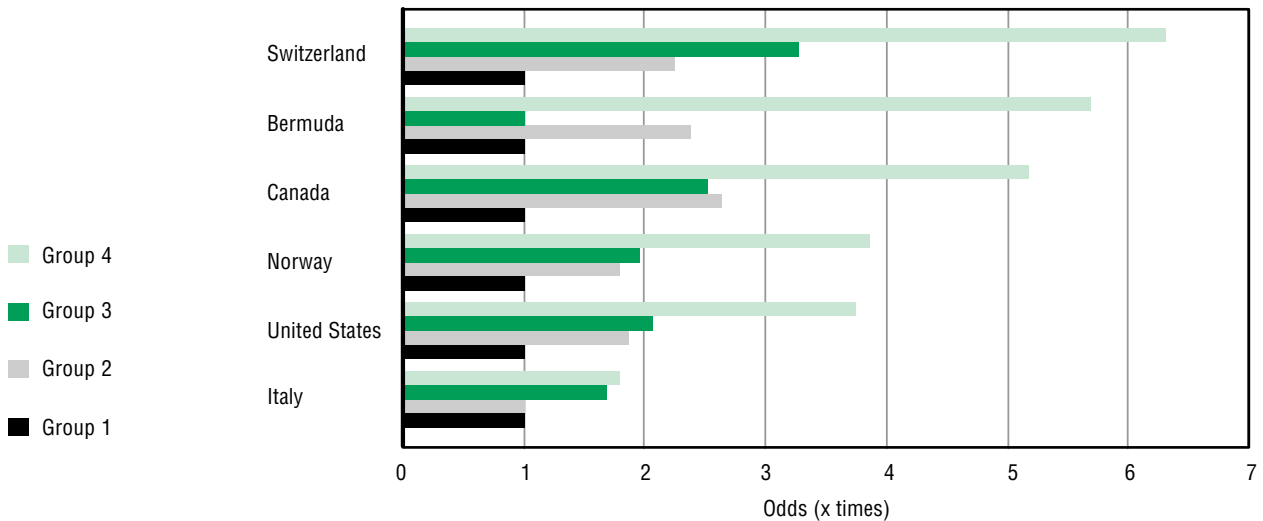
Source: Adult Literacy and Life Skills Survey, 2003.

The ALL data have also been used to create a combined literacy and ICT use index. Analysis of the data has revealed that having high literacy and being an intense user of ICT greatly increases the probability of holding a stable and high-wage job (OECD and Statistics Canada, 2005). The results presented in Figure 3.2C offer a strong indication that the potential benefits to having both high literacy skills and being an intense ICT user may be substantial.

FIGURE 3.2C

Likelihood of being a top income quartile earner by combined skill and user profiles

Adjusted odds ratios showing the likelihood of adults aged 16 to 65 of being a top income quartile earner by combined literacy skill and computer user profiles, 2003



Countries are ranked by the odds of those in Group 4.

1. Odds estimates that are not statistically different from one at conventional levels of significance are reported as one in the figure.
2. See Box 3B.

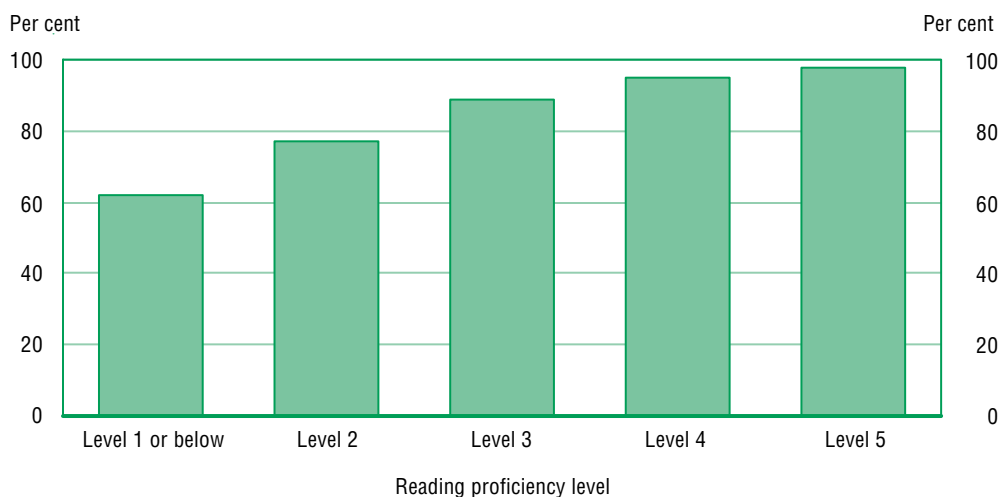
Source: Adult Literacy and Life Skills Survey, 2003.

3.5 Individual Education Outcomes

Literacy has a profound impact on educational access and persistence to increasing levels of education. This should come as no surprise because literacy is in fact one of the prized outputs of basic education and one of the keys to efficient and independent learning. Figure 3.3, drawn from work by Knighton and Bussière (2006), using the PISA 2000 data from OECD and the Canadian Youth in Transition Longitudinal Survey, reveals that high school completion is highly conditioned on literacy level.

FIGURE 3.3

Percentage of youth who had completed high school by age 19 by their reading proficiency level at age 15, 2000 and 2003



Sources: PISA 2000 data from OECD and Youth in Transition Longitudinal Survey, Statistics Canada.

Findings from the same study show that participation in post-secondary education is also highly dependent on literacy level. Table 3.2 shows the odds of participation in post-secondary education and reading literacy level. The results reveal that post-secondary participation rates increase progressively with reading proficiency level, and that significant differences in participation rates exist among all reading proficiency levels. Willms (2003) has also shown that literacy and numeracy have a marked effect on initial post-secondary participation.

TABLE 3.2

Odds ratios indicating the effect of reading literacy level on participation in post-secondary education, Canada, 2000 and 2003

Characteristics	Estimate	Standard error	Odds ratio
Reading proficiency level 1	G	G	G
Reading proficiency level 2	0.69	0.375	2.16
Reading proficiency level 3	1.29	0.353	4.14 *
Reading proficiency level 4	1.92	0.362	8.04 *
Reading proficiency level 5	2.65	0.416	16.77 *

G reference group

* significant at $p < .05$

Sources: PISA 2000 data from OECD and Youth in Transition Longitudinal Survey, Statistics Canada.

Given the relationship that high school completion and post-secondary participation have on various markers of labour market success, including employability and wage rates, these findings suggest that adults with low literacy skills face large lifetime costs. Many countries are investing significant public resources to support higher levels of provision of formal, non-formal and informal adult learning. These

investments are motivated by a perceived need to compensate for low educational participation and low educational quality in earlier periods, for skill loss and to meet rising skill demands.

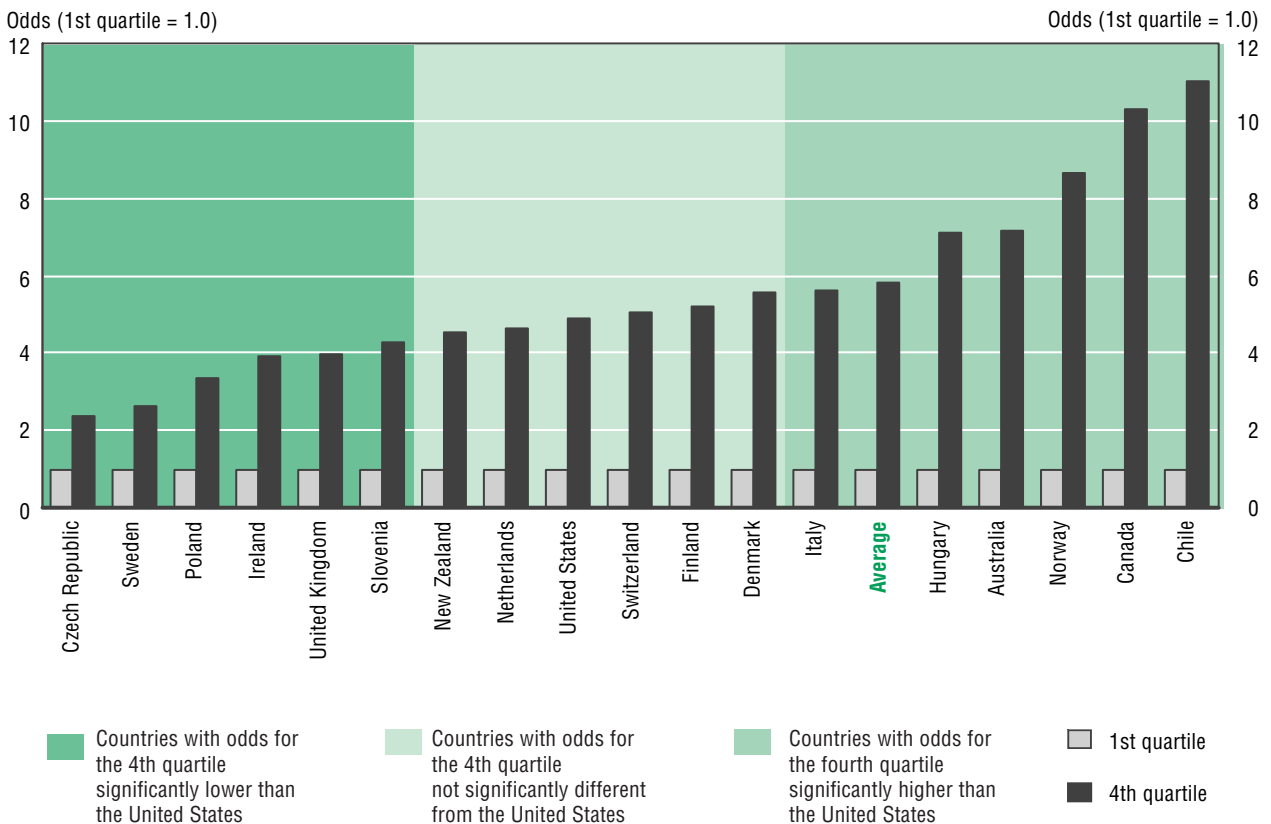
A large body of evidence has established the impact that literacy and numeracy skill have on the human capital formation of adults through their participation in these types of learning. Analyses by Tuijnman and Belanger (1997), Belanger and Valdivielso (1997), Tuijnman and Boudard (2001) and Rubenson and Desjardins (2007), establish that there are very large social inequities in access to adult education and training systems by literacy level, particularly those offered or supported by employers. Figure 3.4, drawn from Tuijnman and Boudard (2001), shows that low-skilled workers in Canada are over 10 times less likely to receive employer support for training than their more literate peers.

FIGURE 3.4

Likelihood of receiving employer support for training

Odds of participating in employer-sponsored adult education and training, by document literacy levels and by extent of literacy engagement at work, population aged 25 to 65, 1994-1998

Odds of receiving employer support for training by document literacy levels



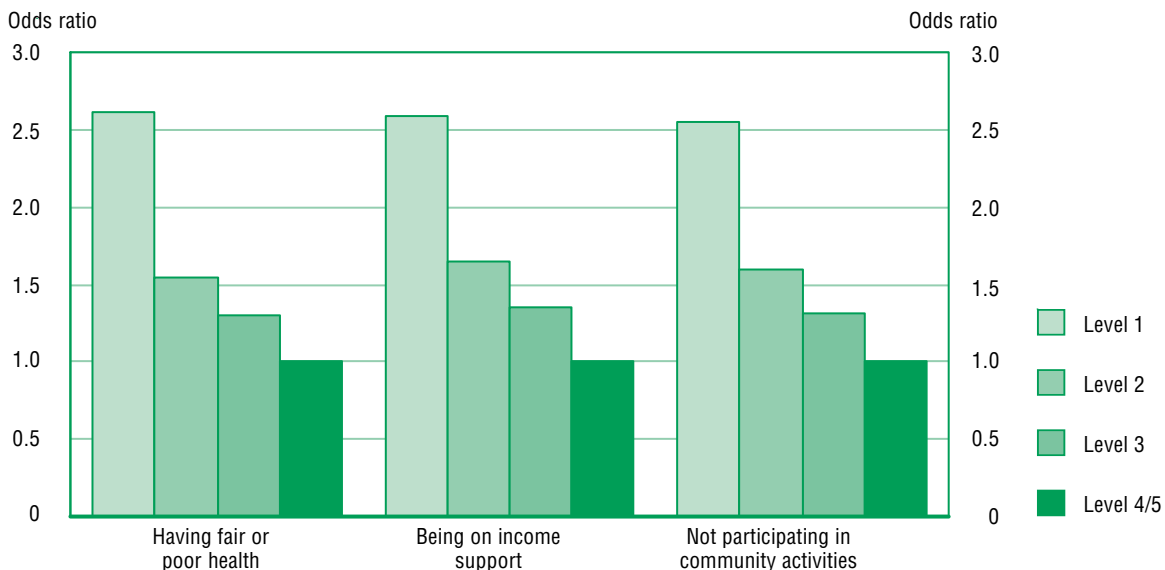
Source: OECD and Statistics Canada (2000).

3.6 Individual Health Outcomes

Literacy skill also plays an important role in ensuring the health of populations. To the extent that overall levels of population health depend upon individual choices concerning diet and lifestyle, literacy and ICT skills, as defined above, can play a significant role by enabling people to have access to information that is relevant to their health. Analysis of data from the ALL study reveals a strong relationship between self-reported general health status, physical health status and mental health status and health literacy – a measure that evaluates an individual’s ability to understand and apply health information presented in print (Canadian Council on Learning, 2008). The ALL health literacy scale combines prose literacy, document literacy and numeracy skills. The results presented in Figure 3.5 show that these relationships – between health status and health literacy – influence a range of markers of productivity on the job.

FIGURE 3.5

Comparison of social and health outcomes by health literacy level, Canadian population aged 16 to 65, 2003



Source: Canadian Council on Learning (2008).

The relationship of skill to health, however, goes deeper than access to information. Ironically, in many countries workers with lower literacy skill levels are selected into occupations that expose them to higher levels of risk to illness and accident – and, hence place higher health literacy demands on these workers rather than less.

The weight of empirical evidence also suggests that, by helping individuals adapt to change and to exert some control over this process, skill helps to reduce stress levels. Stress is insidious in that it impairs the human immune system in ways that lead to higher levels of morbidity and mortality from a range of diseases.

Secombe, Lockwood and Reder (2007), using data from the Longitudinal Study of Adult Literacy (LSAL), report that adults with lower levels of literacy are

less likely to have a usual provider, to have health insurance, and they have trouble understanding written medical directions, more difficulty getting needed care, and poorer health. They also use physician services, overnight hospital stays, and emergency rooms more frequently, controlling for education, access, health, and socio-demographic characteristics. Their study confirms that literacy is conceptually distinct from education and independently affects the way in which adults seek health care.

3.7 Individual Social Outcomes

Skills are integral to achieving universally accepted objectives with respect to human rights and democratic values. The right to education set forth in the 1948 Universal Declaration of Human Rights, the Jomtien Declaration on Education for All (UNESCO, 1990), the Hamburg Declaration on Adult Learning (UIE, 1997), and the United Nations Millennium Development Goals (UN, 2000), all reinforce the role of skill in redressing imbalances that lead to social inequities in economic and social outcomes. As noted previously, public policy can have a profound impact on the level and social distribution of skill, a fact that obliges those in power to understand the processes of skill acquisition, maintenance and loss in their societies, how skill influences health, economic, social and educational outcomes at all levels, and what they might do to improve both.

Literacy also plays a key role in sustaining the democratic process. Paulo Freire highlights literacy skill as central to the process of “conscientisation,” where citizens question the way things are and undertake to change them for the better (Freire, 1970). As such, skill enables politically active participation in social and economic transformation (UNESCO, 1975).

Skill plays a role in defining the collective ability to deal with issues of the environment and sustainable development. Throughout the millennia human societies have learned the hard way how to coexist with the natural environment. The rate of growth of human populations and the development of human societies and the global economy represent an enormous challenge to the long-term survival of the species. Literacy skill has the potential to transcend parochial interests, to enlighten, and to lead to environmentally sustainable lifestyles. The alternative is not a desirable option. Understanding literacy skill, its distribution in the population, and its relationship to individual and societal outcomes, is part of the solution.

Findings from the IALS study (OECD and HRDC, 1997) confirm the existence of a strong link between literacy and social engagement measured by the proportion of adults who participated in voluntary community activities at least once a month.

Coleman (1988) identified the fact that information is an important dimension of social capital, one that contributes to trust and norm-building by extending the reputation of an individual beyond his or her immediate contacts, a reputation that might be traded for other value. Information is often the medium of exchange that creates social cohesion and solidarity, as in the “back-fence” conversation. Information facilitates individual actions, such as finding a job, and collective action, such as mobilising social movements through telephone trees.

Based on findings from a study of formal and informal adult education in North Ireland, Schuller and Field (1998) suggest that social capital may be drawn on as a buffer for the lack of human capital certification (i.e., a high school diploma). Strawn (2003) confirms that adults use social networks to compensate for limited human capital, including literacy.

3.8 Performance of Firms

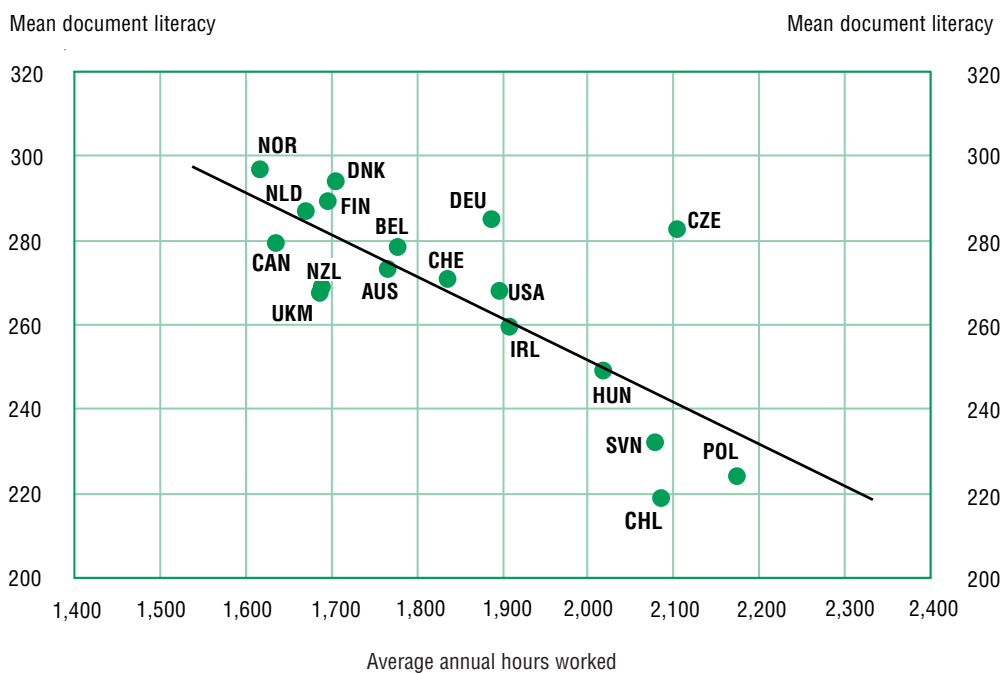
Skill plays a role in determining the efficiency and effectiveness of social institutions. This includes the subset of institutions that produce public goods and services. Governments are concerned with finding ways to reduce the cost of producing and delivering public services such as education, health and social welfare. A skilled population makes fewer demands on the system. When they do need service a more literate population is able to make use of more efficient and less costly delivery modes. For example, ICT-literate citizens are able to access health information via the internet and to manage health-related tasks themselves with less assistance from expensive health care professionals.

The evidence presented in the previous sections of this chapter has indicated that literacy is a valuable economic asset, one that leads to higher levels of output per hour worked and hence to higher wage rates. Some of the benefits of increased literacy might, however, be retained by firms (or passed along to shareholders) rather than being distributed to workers. Thus, a 10 per cent increase in worker productivity attributable to higher worker literacy might be rewarded by a 5 per cent wage increase, with the rest of the benefit accruing to the firm in the form of higher retained earnings, to their customers in lower prices or higher quality goods and services, or be distributed to shareholders. There is some evidence, shown in Figure 3.6, that some of the productivity benefits that accrue to literacy are, in fact, passed along to workers in the form of reduced hours of work.

FIGURE 3.6

Labour volume by literacy level

Average annual hours worked per person in employment and mean literacy proficiency, document scale, population aged 16 to 65, 1994-1998



Source: OECD and Statistics Canada (2000).

Few studies have looked at whether firms with more skilled employees are more productive or more profitable than firms with less skilled employees. Even fewer studies have attempted to isolate the effects of higher literacy skills.

The Canadian Human Resources Trucking Council has undertaken research that provides an interesting example of how literacy skills might influence the bottom line of firms in the heavy trucking industry (CHRTC, 2003). They report that a large percentage of drivers do not meet the industry standards set for prose literacy, document literacy and numeracy skills. They also report that low literacy skills influence the bottom line of their member firms. Drivers with lower levels of skill are more likely to experience an accident or a spill and hence influence insurance cost in an industry where insurance is a major component of the cost base.

Bloom, Burrows, Lafleur and Squires (1997) surveyed 41 Canadian firms, which offered literacy training to their employees. Twenty-one of these companies provided qualitative feedback on the benefits of literacy training to their organisations, which included better team performance, improved labour-management relations, a reduced error rate, and increased output of products and services.

In 1988, the Canadian Business Task Force attempted to estimate the cost of illiteracy to Canada. Using Grade 9 graduation as a proxy for the number of low-skilled workers in Canada, the Task Force generated the rough approximations indicated in Table 3.3. In 2006, this same share of GDP would translate into an estimate of \$34 billion.

TABLE 3.3

Estimated cost of low literacy to Canada, mid-1980s

Industrial accidents	\$1.6 billion
Lost productivity	\$2.5 billion
Direct training	\$0.05 billion
Lost earnings	\$8.8 billion
Unemployment insurance	\$0.17 billion
Federal prisons	\$0.08 billion
Direct costs to business (first three items)	\$4.2 billion
Costs to society (rest of items)	\$10.7 billion
Total costs	\$14.9 billion
Per cent of GDP in 1988	2.4 %

Source: Canadian Business Task Force (1988).

Johnston (2004) provides a summary of what little evidence is available internationally. He reports that the National Skills Task Force (2000), for example, refers to a number of studies comparing matched samples of manufacturing firms in different countries, where differences in productivity are related to differences in skills. These studies focus on intermediate and higher level skills, however, rather than literacy skills. There do not appear to be any studies that compare firms according to their levels of basic literacy skills. Some studies have also looked at the effects of particular training programmes on firm productivity, as is described, for example, in Ananiadou,

Jenkins and Wolf (2003). Johnston (2004) also describes a report presenting four New Zealand case studies of workplaces that had introduced literacy programmes for their employees. The surveyed firms reported a number of benefits, including a decrease in error rates, improved levels of participation in team meetings, growth in employees' confidence, and an improved ability to work more flexibly.

Similarly, respondents in a survey of 30 Australian firms (Pearson, 1996) reported many benefits, including productivity benefits, from workplace literacy training. In particular, 70 per cent of the managers and supervisors interviewed consider that their workplaces had made perceptible cost savings directly linked to language and literacy training at work.

In other surveys, firms identify the costs they face because of the poor literacy skills they perceive amongst their employees (whether or not these are being addressed). In a much-cited study, the Adult Literacy and Basic Skills Unit (1993) asked employers in the United Kingdom to identify these costs. The ALBSU estimated that poor literacy skills cost each company employing more than 50 employees an average of £165,000 every year in poor quality control, lost orders and poor communication. Grossing this up to a national level, the report estimated that poor literacy skills cost the UK industry more than £4.8 billion a year. More recently, the ALBSU (now renamed the Basic Skills Unit) estimated that poor literacy skills cost the Welsh economy more than £558 million a year (Basic Skills Agency and Institute for Welsh Affairs, 2002).

These findings are important to Portugal because falling birth rates may presage a period of labour shortages in which the cost of recruitment, retention and training will play an increasingly important role in the success of firms.

3.9 Performance of Schools and Communities

Although there is little conclusive evidence in support of this hypothesis, it is reasonable to assume that the average level of student literacy has an impact on the efficiency and effectiveness of the educational process, and hence upon what students learn and can do. Willms (2006) uses a range of international data to show two effects: First, the higher the degree of between-school segregation in the educational system the lower the average literacy scores achieved overall; and second, between-school segregation has a stronger negative effect on children from lower socio-economic backgrounds.

Given the proportion of their GDP the OECD countries invest in education and the fact that participation rates in post-secondary education are increasing in recent cohorts it is certain that the efficiency and effectiveness of investments in tertiary education are constrained by the number of low-skilled students leaving the secondary system.

Very little is known about the relationship between average literacy levels and the distribution of literacy skill to the success of communities but it is reasonable to assume, given the influence of literacy on individual outcomes, that literacy differences among communities underlie variation in their relative economic and social performance.

Research has also established a link between literacy and health at the community level. Literacy has been shown to be a key determinant of socio-economic status because of its influence on wages, employment and education. Despite Canada's universal health insurance and more comprehensive social security system, the

association between lower socio-economic status and the incidence of many common cancers is as strong in Ontario as it is in the United States, a fact implicating literacy (Mackillop *et al.*, 2000).

The next chapter will review the evidence about the macroeconomic effects of literacy.

Evidence on the Macroeconomic Effects of Literacy

Data analyses based on the IALS and ALL studies have established beyond doubt that literacy is a valuable economic commodity. Employers in most countries seem to be able to identify and reward literacy skills. The estimated effect of literacy on wages and employment seems to be highest in economies where skill demand is high and where skill supply is of variable quality. In contrast, where skill supply is high and of relatively uniform quality, as is the case in Sweden, then wage premia tend to go to other attributes. This finding does not mean that literacy is not economically important – the limited evidence from the firm level and from demand side measures such as Human Resources and Skill Development Canada’s Essential Skills Profiles tell us that it is (HRSDC, 2009). The finding warns against relying too much on estimated individual wage and employment effects because they are heavily influenced by the *relative* state of literacy skill supply and demand.

Accordingly, this chapter turns to the macro-level to examine the empirical evidence about how the level and distribution of literacy skill have influenced economic performance over the past 50 years.

4.1 Literacy Level and Aggregate Economic Performance

The measurement of the literacy skills of adults is a relatively recent field so much of the available empirical work has employed proxy variables, such as years of schooling and educational attainment, to shed light on the relationship between literacy and macroeconomic outcomes. Most studies assume that these education variables are reliable indicators of literacy levels within countries, between countries and over time – an assumption that we shall see later is mistaken.

The available empirical work on the role of human capital accumulation in cross-country growth³ confirms that schooling has had a positive and significant effect on transitory growth and on the long-run level of labour productivity or per capita income, at least when the sample of countries includes both developed and developing countries (Barro, 2001).

3. Temple (2000) presents a survey of empirical studies examining the growth effects of human capital and social capital across OECD countries. Krueger and Lindahl (2001) present a broader discussion of empirical studies dealing with human capital and economic growth.

In their background paper for the 2006 UNESCO Education for All Global Monitoring Report, Cameron and Cameron (2005) provide a summary review of the evidence and conclude that the macroeconomic effects of literacy and closely associated years of schooling are inconclusive. These doubts reflect concerns about data quality and the methodology underpinning the specification of regression analyses (e.g., Levine and Renelt, 1992; Temple, 2000; Hoover and Perez, 2004).

Other studies, however, based upon more robust measures of literacy skill, appear to contradict this conclusion. Hanushek and Kimko (2000), criticising the failure of previous cross-country studies to account for differences in the quality of schooling, use international tests of student achievement in mathematics and science as their indicators of labour force quality. They find the relationship between these indicators and economic growth to be consistently strong across the 31 countries for which data were available.

Coulombe, Tremblay and Marchand (2004), using data from the International Adult Literacy Survey (IALS) for 14 OECD countries, find that literacy scores had a positive and significant effect on both short-run growth and long-run levels of GDP per capita, and on labour productivity.

Coulombe and Tremblay (2006), using data from the Canadian ALL study, show that literacy levels and distributions have had a marked impact on long-term growth rates of provincial GDP and labour productivity. Specifically, under the assumption that long-term relationships hold, they find that a 1 per cent increase in the average literacy level would precipitate a 1.5 per cent permanent increase in GDP per capita and a 2.5 per cent increase in labour productivity. Two additional findings of this analysis are notable. First, the authors find that the proportion of low skilled adults in the population reduces long-term growth rates, a fact that suggests that policies aimed at raising average literacy levels by reducing the proportion of low-skilled adults will have the best returns. Second, they are able to identify that the positive effect of literacy on economic growth is independent of a strong positive effect of post-secondary education participation. Hence it would seem that both matter. A third study by Coulombe and Tremblay (2006) reveals that immigrants to Canada do not possess official language literacy skills commensurate with their education levels. While not surprising this is troubling given the importance of immigration as a source of net labour force growth in many countries, including Portugal.

Collectively the Coulombe studies offer a basis for approximating the economic value that might accrue to an investment in human capital that moved the Canadian average literacy level up by 10 points, the equivalent of 2 per cent. An increase of this magnitude is not large when judged from an educational perspective – it is the equivalent of the gain in literacy associated with 4.8 months of additional schooling on average (Willms, 2003). Yet the economic return would be large – a 3 per cent increase in GDP.

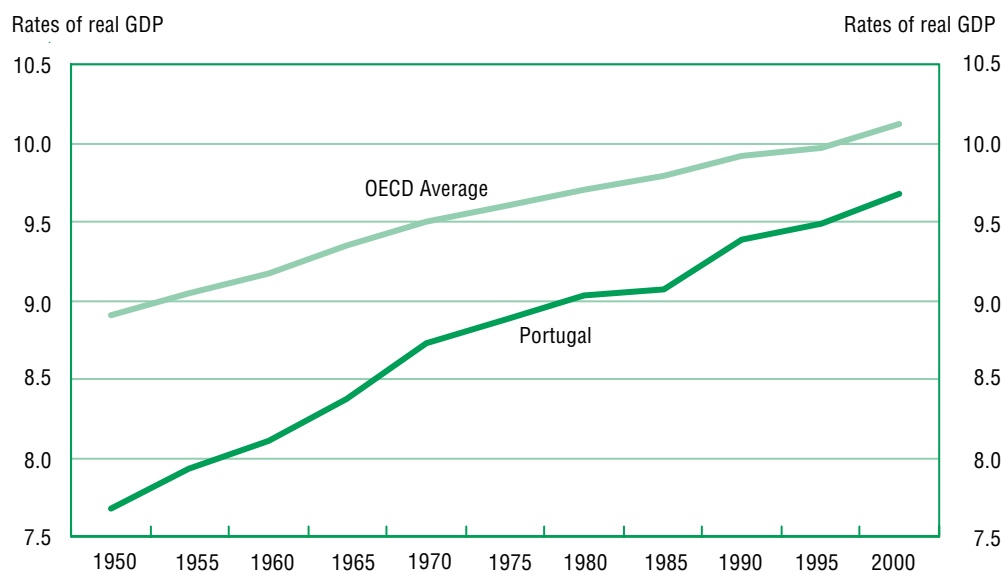
Adding Portugal to Coulombe and Tremblay's (2004) original analysis of 14 OECD countries confirms the key finding of the initial analysis – that is that differences in average literacy scores among youth cohorts aged 18 to 25 – those about to enter the labour market – explain fully 55 per cent of the differences among countries in the growth rate of GDP per capita over the long term (Coulombe and Tremblay, 2009). This finding is singularly important as GDP growth is the primary pathway by which countries improve their standards of living.

Figure 4.1 shows the rate at which Portugal's living standards have been improving relative to the mean level of fifteen OECD countries.⁴ In 1950, the per capita GDP of Portugal was 123 per cent smaller than the 15-country average for the OECD. By 2000, this gap had reduced to 44 per cent only. The process of economic convergence was relatively steady throughout the period, with the notable exception of the early 1980s when convergence came to a halt.

FIGURE 4.1

Comparing Portugal's rate of economic growth over the long term

Rates of real GDP per capital growth, Portugal and selected OECD countries, 1950-2000



Note: GDP data are adjusted for terms-of-trade changes.

Source: Coulombe and Tremblay (2009).

For OECD countries, the evolution of the skills of labour market entrants (population 18 to 25 years of age), derived from the methodology originally developed by Coulombe, Tremblay, and Marchand (2004), and further refined by Coulombe and Tremblay (2006), is depicted in Figure 4.2 for Portugal and the 15-country average. The results are presented for men, women, and the overall population. It is interesting to note that a difference of 10 points in the literacy scale corresponds to skills acquired in one extra year of schooling on average in OECD countries.

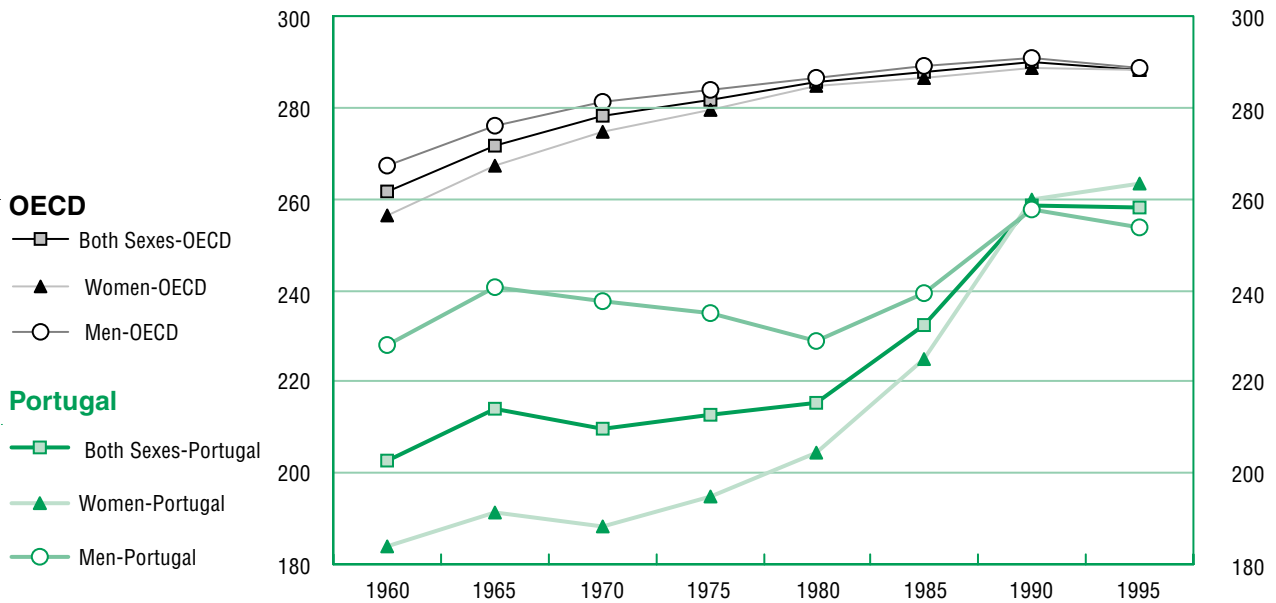
The skill level of labour market entrants continually increases over the 1960-1995 period. The initial gap between the skill level of the male and the female population, favoring the male population and corresponding to around 1.5 year of education, decreases continuously and is eliminated at the end of the period.

⁴ The fifteen countries are Belgium, Canada, Denmark, Finland, Germany, Ireland, Italy, the Netherlands, Norway, New Zealand, Portugal, Sweden, Switzerland, the United Kingdom, and the United States.

FIGURE 4.2

Comparing the quality of Portugal's educational output over the long term

Average prose literacy scores by gender, Portugal and selected OECD countries, 1950-1995



Source: Coulombe and Tremblay (2009).

The three curves plotting the data for Portugal display an idiosyncratic path. The main results are the following:

1. Initially, in 1960, the skill level of Portugal's labour market entrants was the lowest of the 15 countries by a substantial margin. Portugal's performance in this respect is worse even than Italy. The initial skill gap between Portugal and the 15-country average corresponded to almost 6 years of education for the overall population, to 4 years for the male population, and to 7 years for the female population.
2. Despite the huge initial gap, no real convergence of literacy performance is observed before 1980. This result indicates that Portugal's education system was very inefficient in generating literacy skills prior to 1965-1970.
3. The only positive sign prior to 1980 is that the Portuguese female skill level started to catch-up to the OECD level around 1970. Between 1970 and 1995, the catching up process of Portuguese women's skill level toward the 15-country average has been relatively constant and spectacular. In 1970, the gap for Portuguese women corresponded to a startling 8.5 years of schooling. By 1995 this gap had been reduced to 2.5 years only. This signifies a remarkable achievement.
4. The real catching-up process of the male skill level in Portugal toward the 15-country average started much later than for women, around 1980. Between 1980 and 1995, the skill gap between the male population in Portugal and the average decreased from 5.8 years to 3.5 years of education.

Taken together, Figures 4.1 and 4.2 suggest that the process of economic convergence observed in Portugal up to the 1980s cannot be accounted for by relative higher investment in human capital. Human capital investment, judged by higher levels of educational attainment, might account for a substantial part of the process by which Portugal improved its relative skill level after 1980 only.

Collectively these findings confirm that Portugal, despite having made spectacular improvement in the quality of its educational output over the past 50 years, still lags its OECD peers in terms of output per worker by a significant amount. This finding suggests that a concerted and co-ordinated effort to simultaneously increase both the supply of, and demand for, literacy skill to the average level achieved by other countries in the OECD area hold the promise of large GDP gains.

For Canada estimates of the costs and benefits of a literacy investment large enough to bring all adults up to literacy Level 3 imply a rate of return of 251 per cent per annum and an approximate pay back period of 4.8 months (Murray, Jones, Shillington, Willms and Glickman, 2008). Thus the estimated return is high enough to warrant investment. Moreover, the results are likely under-estimates of the true economic returns because they exclude a range of externalities – indirect benefits associated with lower health, social and educational costs and increases in consumption taxes. Adding in these additional benefits would strengthen the case for investment.

For Canada the estimated economic benefits vary considerably by province and territory as a result of differences in industrial, occupational and wage structures. In a few cases, bringing all adults up to literacy Level 3 precipitates a slight drop in earnings. This reinforces the need for government policies to stimulate the level of skill demand in the economy, policies that would ensure that the Canadian economy is able to absorb and apply the skills available to it. The analysis does not include estimates of rates of return by province and territory because the sample sizes available in the Canadian Survey of Reading Skills were not sufficiently large to produce reliable estimates of the size of the market segments at this level.

A second analysis, one that uses the historical relationship between literacy skill and the rate of overall economic growth to derive an alternate estimate of the economic returns, also provides evidence of large positive benefits. A literacy investment of the proposed magnitude is estimated to yield significant rates of return. Table 4.1 suggests estimated rates of return of 36, 80 and 83 per cent over 5, 10 and 25 years respectively – attractive by any standard (McCracken and Murray, 2008).

TABLE 4.1

Estimated internal rates of return accruing to investments in literacy, Canada

Estimated net benefit (\$)	Discount rate	Internal rate of return (%)
Net benefit (25 year horizon)		
1,949,871,628,673	0	83
825,264,279,156	0.05	
385,563,050,106	0.1	
Net Benefit (10 year horizon)		
164,333,771,476	0	80
109,067,514,464	0.05	
73,940,546,975	0.1	
Net Benefit (5 year horizon)		
8,890,902,805	0	36
6,380,331,391	0.05	
4,506,380,138	0.1	

Source: McCracken and Murray (2008).

The fact that these estimates of rates of return are lower than the estimated direct benefits suggests that the Canadian economy will have difficulty absorbing the additional supply of literacy skill. This reinforces the need for measures to increase the demand for literacy skill to compliment the supply-side investments, a situation that is mirrored in Portugal.

4.2 Distributional Effects of Literacy on Aggregate Economic Performance

The previous section reviewed the evidence of the impact that average literacy levels have on aggregate rates of economic growth. The *distribution* of literacy in a population might also influence economic performance but the evidence base is thin. Jenson (2004) reports that persistent inequalities of outcomes are a costly economic deadweight in terms of lost productivity, foregone tax revenue, reduced consumer spending and higher expenditures on income assistance, social services, health care and security. Inequalities impose economic as well as social and individual costs. Given the influence of literacy in creating inequality in individual labour market outcomes, it is reasonable to assume that literacy will have a distributional effect on economic growth. Johnston (2004) reviews several studies investigating this relationship:

Ahluwalia (1976), using a cross-sectional data set for 62 developed and developing countries, finds that increases in national literacy rates have a positive impact on the income share of the poorest 40 per cent, whereas increases in secondary school enrolment have a beneficial effect on the income share of the middle 40 per cent. Since both these effects are at the expense of the income share of the richest 20 per cent, they both implied a reduction in inequality, but the increase in literacy would have the larger effect on inequality (by most measures) and poverty.

De Gregorio and Lee (2002), using panel data covering a broad range of countries for the period 1960-1990, examine the relationships between average educational attainment, educational inequality, and income inequality. They report that, as average education increases, income inequality at first worsens and then improves. Furthermore, income inequality increases with rising inequality of educational attainment. This suggests that literacy interventions, by pushing up educational levels amongst the least-educated groups and reducing the dispersion of educational attainment, are likely to ameliorate income inequality.

Anh and Meyer's (1999) study of joint venture investment in Vietnam highlights the operation of a particular channel through which literacy might affect economic growth, namely through attracting foreign investors. An important caveat to the results from this study is that it does not show that Vietnam as a whole has benefited from its relatively high literacy rates; it may be that literacy affected the spatial distribution, but not the total amount of foreign investment. This suggests a channel through which social wealth (in the form of knowledgeable government officers), financial wealth, produced wealth and human wealth may all interact in order to increase regional growth but leaves unanswered the extent that this investment increased the (various forms of) wealth of Vietnamese regions, and which households or individuals have been able to access this wealth.

Sachs and Warner (1997) test a number of measures of human capital, including adult literacy, for their effect on growth and find a statistically significant S-shaped relationship with maximum effect when literacy is broadly distributed.

However, they do find significant correlations between changes in literacy and changes in life expectancy and between changes in life expectancy and changes in per capita income. They conclude that these two relationships are suggestive of an indirect channel through which adult literacy could affect per capita income.

Coulombe, Tremblay and Marchand (2004) identify a distributional effect in which higher percentages of low skilled adults constrain economic performance over the long term, an effect that Murray (2005) attributes to the effect of variable worker quality on employer's choices of technology and work organisation. Specifically, the authors find that countries that have a high proportion of adults with low prose skills, and (conversely) those that have a low proportion with high prose skills, had a lower GDP per capita. The higher the proportion of adults with low prose skills, and the lower the proportion with high prose skills, the lower that country's GDP per capita.

There is a possibility that some of the productivity effects of literacy captured by the empirical studies reviewed so far are actually the result of more literate workers being less prone to health problems that impair their efficiency. Davis and colleagues have explored the relationship between lost economic output due to worker health problems, sick days and reduced productivity (Davis, Collins, Doty, Ho and Holmgren, 2005). As shown in Table 4.2 the study shows that health problems and sick days impose a huge economic cost on the economy of the United States, one that amounts to roughly 2.4 per cent of GDP. No one yet knows what percentage of these losses is attributable to literacy – research work to establish an estimate is on-going.

TABLE 4.2

Estimated lost economic output because of worker health problems, sick days, and reduced productivity, population aged 19 to 64,¹ United States, 2003

	Number of adults	Lost days of work	Lost economic output
	Million	Million	Billion of dollars
Nonworking adults: report disability, handicap, or chronic disease or nonworking because of health reasons	18	4,487	185
Workers with any sick days	69	407	48
Workers with reduced productivity days	55	478	27
Total sick days or reduced-productivity days	103²	5,372	260

1. The total number of adults ages 19 to 64 was 148 million, excluding among working adults those who are self-employed and those who do not report a wage rate. The number of adults not working for non health-related reasons (31.5 million) is not shown.
Total number of adults shown is sum of those not working because of disability or other health reasons and an unduplicated count of those working who reported missing work because of sickness and/or reduced productivity.
2. Those not working because of disability or other health reasons were estimated to lose 250 days of work per year at minimum wage. Workers who reported being unable to concentrate at work because they were not feeling well or were worried about a sick family member were assumed to work at 50 per cent lower productivity.

Source: The Commonwealth Fund Biennial Health Insurance Survey (2003).

Another study of the aggregate economic impact of health problems in the United States reports that workers with low income, low education and low status occupations have poorer health compared with other workers (Alliance for Excellent Education, 2006). The study finds that the failure to graduate from high school is

associated with higher health costs of roughly US\$17 billion. Given that literacy has a major impact on income, employment, occupational segregation and health it is not too much of an intuitive leap to imagine that much of this effect can be explained by the lower literacy levels of high school drop-outs.

4.3 Globalisation, Competition and Markets for Skill

The work of the early neoclassical growth economists motivated governments in OECD countries to make massive public investments in education. These investments have translated into rapid increases in participation and completion rates at the primary, secondary and post-secondary levels. Aided by the post-war baby boom supply in labour these investments in education were sufficient to meet the evident increases in skill demand. By the early 1980s, however, policy makers were becoming increasingly concerned about skill shortages. Notwithstanding the rapid increases in education output, wage inequality continued to grow, suggesting that something was happening that could not be explained with measures of educational quantity. Most labour market and macroeconomists, however, continued to use indirect measures of skill, such as educational attainment and years of schooling, to explain differences in labour market outcomes at the individual and macroeconomic level. Faced with empirical results that were not consistent with what theory would predict, economists devised increasingly elaborate theories – segmented labour markets, signalling, and discrimination, among others – to explain how labour markets were operating. None of these theories yielded conclusive results when tested empirically.

By the late 1980s, advances in macroeconomic theory started to provide an alternative explanation. The emergence of the endogenous growth theories suggested that human capital would become increasingly important as technological innovation created what was termed skill-biased technical change. The basic hypothesis underlying skill-biased technical change is that new technologies are not only more productive but also demand higher skill levels to employ them, and hence offer the possibility of both higher economic growth and higher wages to workers that possess the requisite skills. Thus policy makers became interested in how skill influenced productivity growth, particularly through its impact on the rate of technical, process and organisational innovation within firms. The accompanying policy rhetoric suggested that economically successful nations would have to have tertiary education systems capable of sustaining high rates of knowledge generation and skilled, flexible and highly adaptable labour forces. This model implied the need for two complementary sets of skills: First, advanced technical skills and awareness of scientific bodies of knowledge sufficient to support the generation of new knowledge and its application in the production process, and second, a set of key competencies that transcend occupations – competencies needed to master modern modes of production and organisation, and which enable efficient learning in adulthood.

Up to this point, researchers believed that the economic demand for skill prevailing at any given location in a country was, in large measure, determined by the industrial and occupational distribution of employment in the economy. After the oil shock of the 1970s all OECD economies began to experience a rapid increase in the demand for these latter skills, a demand that was driven by powerful forces beyond the control of policy makers. By far the most important development influencing the demand for skill during this period was the rapid diffusion of information and communication technologies (ICTs) into production systems at the firm level. The adoption of these technologies precipitated a short-term increase in the demand for technical training and a long-term increase in the level of skill required of most workers,

a classic example of skill-biased technical change. The diffusion of ICT also precipitated a significant change in the organisation of work, with firms adopting less hierarchical structures that increased the need for independent problem-solving, decision-making and communication skills. These organisational changes served to amplify increases in demand for occupationally generic skills.

The economic context within which these changes in technology of production and the organisation of work have occurred has itself created strong incentives for firms to adapt. The general context is one in which processes of globalisation and the integration of markets has afforded firms enormous opportunities for growth while simultaneously exposing them to unprecedented levels of competition.

One feature driving globalisation was the emergence of efficient global capital markets, which, at least until the recent global financial melt-down, afforded firms in all regions access to low-cost finance, thereby reducing barriers to market entry and expansion. A second feature is the consolidation of ownership and the emergence of powerful multi-national firms in many industries. Their existence has greatly increased the mobility of technology, capital and production, a fact that puts additional pressure on firms to reduce costs and increase productivity. A related feature is the emergence of global markets for technology, a fact that has further reduced barriers to market entry for firms. Significant improvements in transportation networks have also contributed to globalisation by reducing transportation costs to the point where these pose much less of a barrier to market entry. Combined with falling prices for key input commodities, improved transportation networks have opened markets to a much larger number of firms.

Massive investments in education made in several developing economies have greatly increased the pool of skilled labour available to multi-national firms. Workers in these countries are capable of adopting the efficient technologies of production and work organisation, enabled by ICTs, and are willing to work for lower wages than those prevailing in OECD countries. This latter fact creates huge incentives for firms to move production to low-cost labour markets.

Finally, political changes have led to a substantial reduction in both tariff and non-tariff barriers to trade in goods and services. The Uruguay Round of the GATT, the North American Free Trade Agreement (NAFTA), MERCOSUR and other multilateral agreements, indeed have had the intended effect of opening up markets. The emergence of the European Union has also reduced barriers to trade, particularly within the European common market.

Faced with unprecedented levels of competition, firms in OECD countries are fully exposed to competition. In a world where capital, goods and services, technology and highly skilled labour flow freely, policy makers are forced to consider the skill set of the average worker because it is this skill base that enables countries to compete in the global economy. This is the case for Portugal, as it is for every other country.

4.4 Public Policy Responses in OECD Countries

The response of governments throughout the OECD area has been to invest heavily in education, in the first instance in the supply and quality of early childhood education and health, then in raising participation levels in secondary and tertiary education. More recently, the focus has shifted to reducing upper secondary dropout rates and, to a lesser extent, in raising the quantity and quality of adult learning.

OECD governments have also created elaborate mechanisms to monitor the supply and demand for skill. In general these systems aim to answer several questions:

What is the demand for skill and how is the demand expected to change? What is the supply of skill and what social institutions can be expected to respond to changes in the demand for skill? What is the quantity and quality of skill flowing out of the formal education system? To what extent is adult learning constrained by low literacy skills? How efficient are markets for skill? Are there barriers to matching that serve to reduce economic growth?

Faced with such questions the initial response involved the assessment of student achievement in schools. Policy makers were interested in the relative quantity and quality of skill generated in initial education, and in the social and economic consequences that were associated with social inequality in the distribution of educational outcomes.

For the most part public policy interests in the economic dimensions of human capital and its role in fostering economic growth and competitiveness in a global knowledge economy have concentrated on the elite end of the skill distribution and on the institutions that generate advanced knowledge, including universities and research institutions. Policy makers have focused on rates of participation in tertiary education and on the relative quality of tertiary programmes, particularly in the natural sciences at the masters and doctoral levels. Policy has also explored the role of research and development in the innovation process, including a focus on the efficiency and effectiveness of knowledge creation, transmission and management systems.

Finally, policy makers have spent time looking at individual and firm characteristics that are associated with achieving the high rates of technological, process, product and organisational innovation that are felt to be needed in order to realise the productivity gains that will keep OECD economies competitive in the global knowledge economy.

In recent years the international research effort has increasingly focused on the middle and bottom end of the skill distribution, including workers' literacy and numeracy skills. This research has concentrated on profiling the level and distribution of a range of skills believed to be tightly linked to the productivity of workers and their ability to absorb technological, process and organisational innovation.

Murray (2005), for example, has provided estimates of the supply of four skills that are known to be tightly linked to job performance in a broad range of occupations (prose literacy, document literacy, numeracy and, more recently, problem solving). Estimates of the impact of ICT skills on the labour market outcomes of individuals have also been developed (Murray, Binkley and Clermont, 2004). These analyses have challenged the prevailing assumptions in several ways. In general they have confirmed that:

- large differences in foundation skills such as literacy and numeracy exist within and between countries;
- these differences matter to individuals in most countries because of the way they influence valued social and economic outcomes;
- these differences also appear to matter to the performance of social institutions, including schools, communities and firms; and,
- both the average level and distribution of literacy matter at the macro-level, to both economic and health outcomes.

With this context the report now turns to an examination of Portugal's response to the literacy challenge, including the quality and quantity of educational outcomes.

How Portugal Compares: Education Outcomes and the Quality of the Workforce

Although all European countries are pursuing education policy reforms addressing specific issues of national concern, some overarching common trends can also be discerned. These include expanding enrolments and enlarging timetables in pre-primary schooling, reducing early school leaving and raising graduation rates in upper secondary education, and generally improving access to tertiary education. There also is a general emphasis on measures to improve education quality and labour market outcomes, and a focus on the knowledge and competencies possessed by the student population, rather than the acquisition of curriculum-based qualifications per se.

In recent years Portugal has embarked on a series of major and long overdue policy reforms in the education sector. An important development is the expansion of intake capacity in public pre-primary provision as well as the enlargement of the timetables. The expanded provision of pre-primary services for three to five year olds reflects the broad understanding of the long-lasting benefits of such provision in terms of enhanced literacy learning, improved school readiness and socialisation, and subsequent learning gains made in compulsory basic education.

The National Reading Plan is another important programme designed to improve the school readiness of young children and enhance the literacy competencies acquired in the first six years of basic education. The recent extension of the compulsory school age from 14 to 15 years is another important development. The objectives are to improve student achievement in key subjects such as literacy and numeracy and to reduce school failure and early school leaving in secondary education. Eventually the goal is to make a full cycle of basic and upper secondary education, of at least 12 years' duration, the minimum start qualification for the entire young population of Portugal. To this end Portugal's parliament recently approved a proposal to extend the period of compulsory education from nine to 12 years.

The comparative evidence presented in subsequent sections of this chapter demonstrate the extent of the challenges still besetting the Portuguese education system as it seeks to catch up with those countries in Europe that embarked on major education policy reforms well before Portugal launched its recent initiatives to improve learning and teaching conditions, particularly in pre-school education and in the 1st cycle of

basic education. The data are mostly derived from international education indicators collected by the OECD, EUROSTAT and EURYDICE.

5.1 Relative Size of the Current School-Age Cohort

As elsewhere in Europe, Portugal's birth rate has declined and the population is ageing. There also are common migration patterns, with larger proportions of the population now living in urban environments and rural communities dwindling. Population projections for the entire EU show a school-age population in general decline. As the absolute number of children declines, school rolls fall. This will have consequences for school sizes particularly in rural areas, where schools may have to be closed or merged with others. Over the next decades increases in the school-age population are anticipated for only a handful of European countries, such as Spain and Ireland.

In Portugal the population aged 0-5 years is forecast to decline by a modest 7 points by 2015, thus freeing up some intake capacity in Kindergartens (OECD, 2006). The Portuguese primary and secondary school-age population is expected to be rather stable over the coming decade, although not thereafter, when the relative size of the school age population will begin to decline markedly. Smaller youth cohorts will naturally limit the supply of new skill to the labour market. The population aged 20-29, for example, is expected to decline by up to 21 points by 2025 (OECD, 2008).

Where post-secondary enrolment is still relatively modest, as in Portugal, the decline in the number of young adults will mean that proportionally more students can be accommodated more rapidly in tertiary education. To an extent this may explain the apparent emphasis of Portuguese policy makers on the development of pre-schooling and basic education, and improvement of the retention rate in upper secondary education, rather than the further expansion of tertiary education. Data from the Ministry of Education (2007) indicate that this policy orientation is yielding results, albeit maybe not sufficiently speedily.

The trend that the relative size of the young age cohorts will gradually decline in Portugal over the medium and long term has economic and labour market implications for the country because low birth rates – barring net high-skilled immigration – ultimately mean low turnover in the supply of new skills to the labour market.

5.2 Educational Access, Participation and Graduation

A target to increase participation in pre-school education to 90 per cent of all children from the age of three years to the start of compulsory schooling was set by the Barcelona European Council in 2002. Participation in pre-schooling indeed increased between 2000 and 2006 in Portugal, as it did in most EU countries. Enrolment among 3 and 4 year-olds in Portugal reached 72 per cent in 2006, a figure close to the European average but still short of the target. The current government is committed to creating the conditions so that 100 per cent of five year old children can attend pre-school education by 2010.

From 6 until 15 years of age all Portuguese children are enrolled in basic education. Education is no longer compulsory after this stage. In most European countries, in contrast, compulsory schooling lasts until 16 years, and in an increasing number of countries education is mandatory even until age 18. This is the case, for example, in Belgium and the Netherlands. Consequently, until now, Portuguese youth could expect to receive fewer years of schooling, on average, than their peers in other

countries. The difference could be three or more years, depending on the comparison country. In a clear sign of the political urgency afforded to educational reform, Portugal's parliament recently passed a resolution to increase the period of compulsory schooling by three years. In time this will bring the number of years of compulsory schooling a Portuguese child can expect to receive broadly in line with ambitious EU targets.

From 1995 to 2006 the proportion of students graduating from upper secondary programmes relative to the population at the typical age of graduation among OECD countries progressed by seven percentage points on average. In 22 of 24 OECD countries the upper secondary graduation rate exceeded 70 per cent. Germany and Greece were the two countries with the highest graduation rates in 2006, close to or equal to 100 per cent.

Among Portuguese youth aged 15 to 19 years in 2006, 73 per cent were still enrolled in education on a full-time or part-time basis. This was up from 68 per cent in 1995. However, enrolment in upper secondary education dropped off to 47 per cent among 18 year-olds in 2006, while another 20 per cent of persons in this age group were already enrolled in tertiary education programmes.

At the theoretical age of graduation only 57 per cent of Portuguese youth had in fact graduated from upper secondary education in 2006. This comparatively adverse finding points to relatively low internal efficiency in the Portuguese school system. Factors such as low quality in the learning of foundation skills give rise to grade repetition, which exceeds 25 per cent of all pupils in Portugal, and eventually leads to an elevated drop out rate. Reaching the official EU targets that all young people should complete a full cycle of secondary education and that at least 85 per cent should graduate with useful qualifications is therefore still some time away. As mentioned above, however, Portugal's policy makers are pursuing the policy to make the 12th Grade a national educational minimum for all. As part of the effort to ensure that all students attend school until they reach 18 years of age, the government is modernising the upper secondary curriculum and has introduced secondary professional education. These initiatives are highly significant because they have already led to a substantial reduction in the number of early school leavers.

Interestingly, among those enrolled in upper secondary education in Portugal, 69 per cent attended programmes with a general orientation while 31 per cent were enrolled in pre-vocational, vocational or professional programmes. It is the intention of the Portuguese government to increase the overall rate of retention in upper secondary education by increasing the proportion attending vocational and professional programmes. In many countries students enrolled in general secondary programmes outperform their peers in vocational programmes on standardised tests of achievement in mathematics and science. This is not the case in Portugal, however, because students enrolled in vocational and professional programmes scored higher on the OECD-PISA scales in 2006 compared with students in general programmes. This finding requires further investigation.

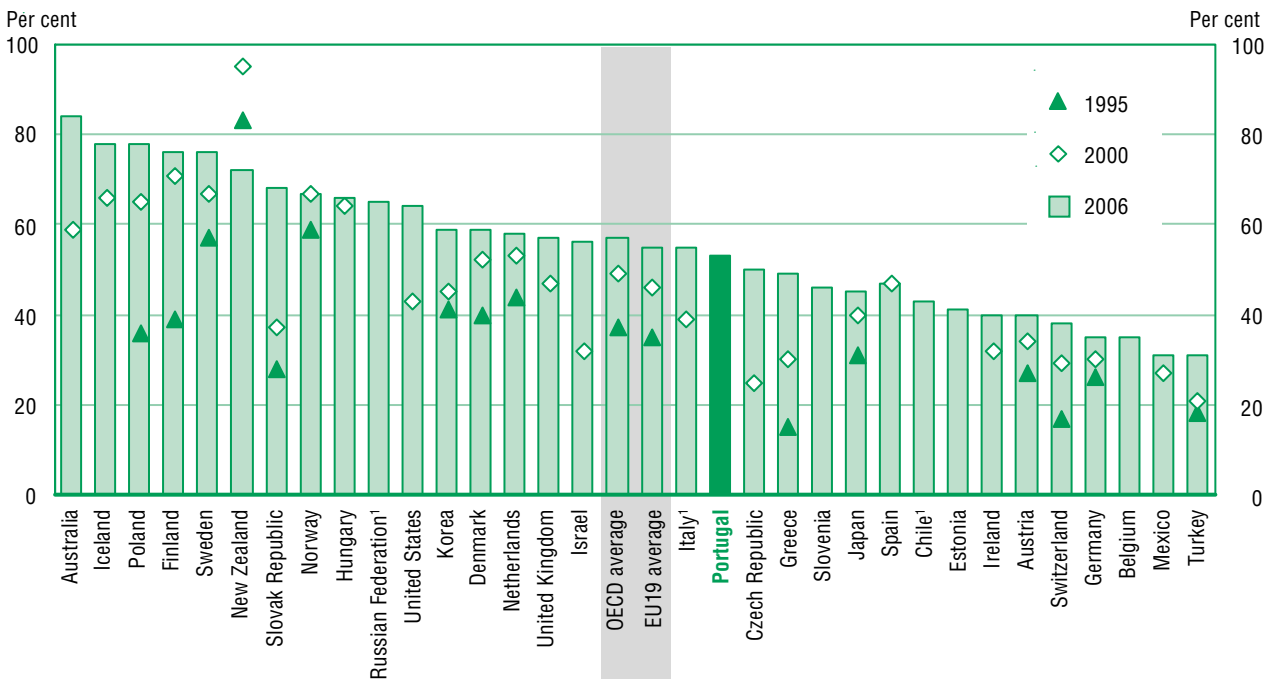
In secondary vocational and professional education the reform emphasis in many EU countries has shifted from offering a large number of specific vocational programmes to reducing the number of programmes and offering a more generally oriented curriculum focused on the acquisition of key competencies, which should form part of recognised vocational qualifications. The adoption of the European Qualifications Framework is expected to push developments further into this direction. Many countries also are building up post-secondary vocational education as an

alternative to further growth of the university system. Data presented subsequently indicate that Portugal has, until recently, not followed this trend. The development of post-secondary education programmes and the introduction of polytechnics alongside the established universities reflect recent advances in education policy.

Higher graduation rates from upper secondary education generally lead to increased demand for tertiary education. Figure 5.1, reproduced from OECD *Education at a Glance* (2008 edition), shows that Portugal had an entry rate into university-level tertiary education of just over 50 per cent in 2006, a rate similar to the OECD and EU averages.

FIGURE 5.1

Entry rates into tertiary education, university level, 1995-2006



Countries are ranked in descending order of entry rates for tertiary education in 2006.

1. Entry rate for tertiary-type A programmes is calculated as gross entry rate in 2006.

Source: OECD, *Education at a Glance* (2008).

While the intake into tertiary education has increased in Portugal in recent years, this is true of other EU countries too. In 2006 enrolment approached or exceeded 70 per cent of all 20-24 year-olds in the Nordic countries and Poland. Tertiary Type-A programmes are mainly theoretically oriented and are designed to provide qualifications for entry into professions with high skill requirements. Tertiary graduation rates therefore show the rate at which a country's education system is building the advanced skills required for the knowledge-based economy and the information society.

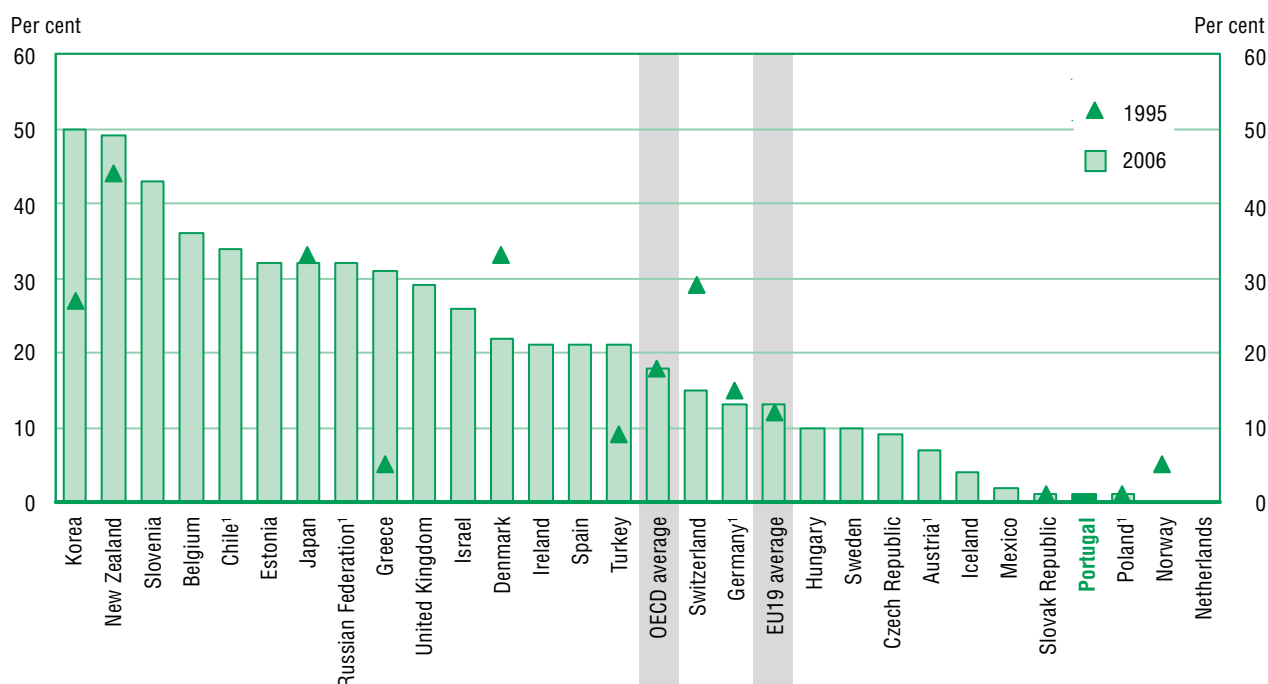
In 2006, on average, 35 per cent of the relevant age group in the EU graduated from Type-A programmes for the first time. With 33 per cent the graduation rate for Portugal was close to the EU average in 2006. Importantly the tertiary Type-A graduation rate more than doubled between 1995 and 2006, rising from 15 to 33 per

cent in little over a decade. The introduction of the polytechnics was a factor in this remarkable achievement. If sustained over time the growth in tertiary enrolments will greatly enhance the level of advanced skills available to the Portuguese economy.

Several common trends influence developments in the European higher education area. First and foremost, as a consequence of the Bologna process, many countries have reformed the structures, organisation and contents of undergraduate education by introducing three- and four-year Bachelor's and Master's programmes. Many countries also continue to enlarge the intake capacity of tertiary education, especially of post-secondary vocational and professional programmes (non-university, Type B). Figure 5.2 shows that enrolment in non-university tertiary education was negligible in Portugal in 2006, possibly because polytechnic education focused on advanced 1st cycle courses is classified as university-level education.

FIGURE 5.2

Entry rates into post-secondary vocational and professional colleges (Type B), 1996 and 2006



Countries are ranked in descending order of entry rates for tertiary-type B education in 2006.

1. Entry rate for tertiary-type B programmes is calculated as gross entry rate in 2006.

Source: OECD, *Education at a Glance* (2008).

Collectively the evidence offered in this section suggests that, whilst much progress has been made towards expanding educational opportunity, the rate at which participation has increased has lagged behind most of Portugal's key trading partners in Europe. Especially important is the shortfall in upper secondary education. In time the extension of the compulsory school age and the ambitious redesign of the upper secondary stage will address this. Faced with a gap in the quantity of educational output based on current data, we now turn to the available evidence on the quality of current educational output in Portugal.

5.3 The Quality of Current Educational Output

The recent progress made in educational participation in Portugal is not yet reflected in recent output data. Different methods and indicators can be used to measure quality and output. A common tool is to compare the scores of a representative sample of students on a standardised test of student achievement administered in different countries. Several such international tools exist, for example, PIRLS, TIMSS and PISA. For the purposes of this report it suffices to display the findings of the latest PISA survey of student achievement in science.

The results of international assessments of student achievement are widely used as a basis for evaluation, accountability, policy analysis and debate about educational reform. International surveys of educational achievement have been undertaken since the 1960s, but more recently, globalisation has enabled countries in search for world-class standards of quality to examine their education systems in relation to those of other countries with both similar and different economic and social structures. The PISA results have broadly increased public awareness that countries' education systems differ in the results achieved, with respect to both average performance and its distribution in terms of proportions of high and low scoring students.

PISA results for Portugal generally show a bleak picture. Figure 5.3 shows the country mean scores and confidence intervals on the PISA science scale for 15-year-old students tested in 2006 (OECD, 2008). The data indicate that the science achievement of Portuguese students still leaves much to be desired in a comparative perspective. Other tests measuring student achievement in reading literacy and mathematics, administered in 2000 and 2003, gave similar results for Portugal.

The PISA results have served as a wake up call for politicians, teachers and the general public in a number of countries, including Portugal. They have contributed to increased awareness of the urgent need to improve quality and learning outcomes. As a result Portugal, like other countries, has embarked on an ambitious series of initiatives designed to improve school quality. The reform plans include the phasing in of the all-day school model, which allows for more student time on task and increased flexibility in the curriculum. Another major step already taken is the introduction of a national programme of in-service training for language teachers in primary schools.

The launch of the Portuguese National Reading Plan (see Box 5.1), aimed at creating and reinforcing good reading habits in pre-schools and basic education but also in families and local communities, and that lead to improved competencies in reading and writing, should be understood in this context, because improving the quality of current output remains a large challenge. Having a high proportion of current students scoring poorly in reading literacy, mathematics and science is incompatible with the vision for the country to reach the Lisbon strategy targets agreed by European heads of state in 2000. It will make it more difficult, for example, to reduce the drop out rate at the theoretical age of graduation from secondary education which, at close to 40 per cent, currently is the second highest in the European Union.

Box 5.1

The National Reading Plan

The National Reading Plan was launched in June 2006 by the Portuguese Government to promote reading in schools as well as in public libraries and other social organisations. The main goals are the development of skills in reading and writing and the broadening and deepening of reading habits among the entire population.

The programmes of the plan have contributed to engaging teachers and educators in reading activities in classrooms, covering all Portuguese schools from Kindergarten to the 9th grade. Municipal initiatives, developed mainly by public libraries in collaboration with schools, are designed to stimulate independent reading and engage professionals in reading initiatives that encourage the pleasure of reading amongst children and youth.

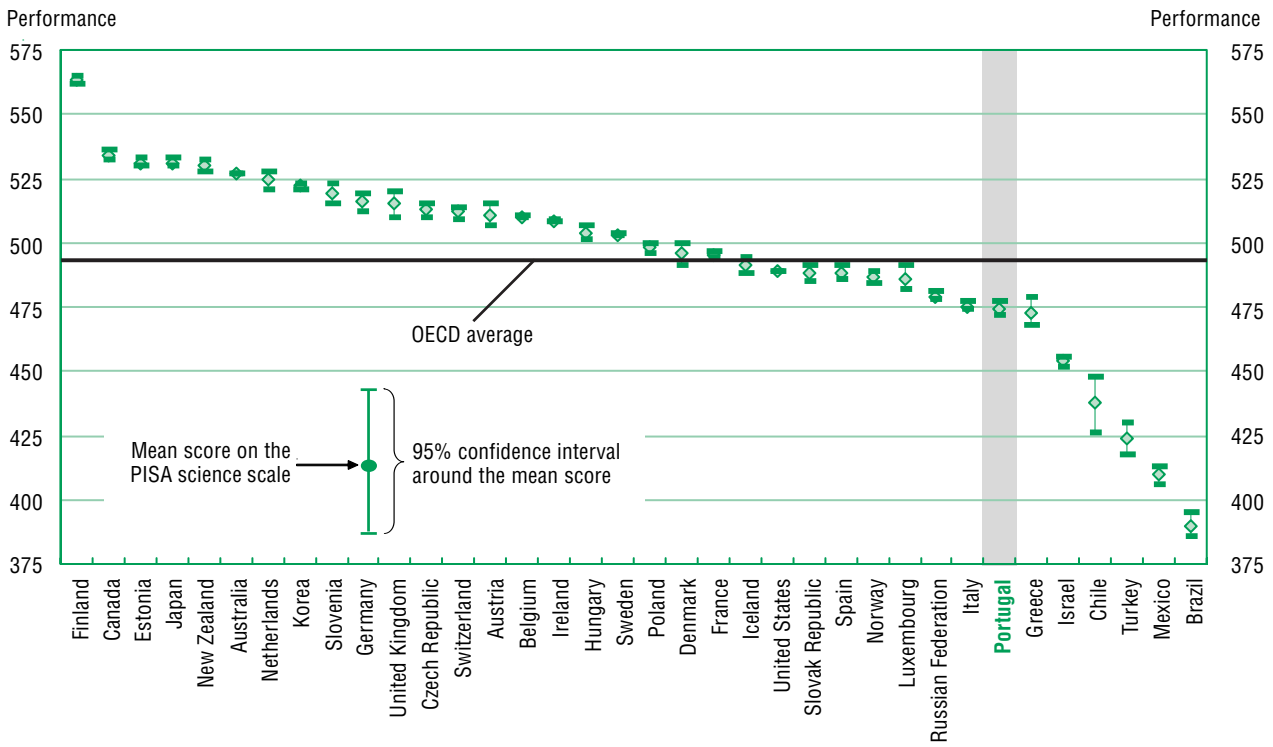
For schools the National Reading Plan officially has set the following main goals for reading promotion: one hour per day reading in class for preschool education (children from 3-5 years) and reading and writing for primary schools (1- 4th grades of basic education) and 50 minutes per week reading and writing activities in 5-9th grades; to develop educational practices and other activities stimulating pleasure in reading amongst students; to create instruments enabling the definition of increasingly more precise targets for the development of reading; to consolidate and increase the role of school libraries in partnership with public libraries in the development of reading habits; to gradually achieve better results in national and international assessment of literacy.

The main activities of the National Reading Plan include:

- offering technical advice concerning the selection of books for different age groups and reading activities within the classroom for different educational levels;
- distributing money to allow school libraries to buy different types of books (fiction, poetry, drama and science books), magazines and internet resources, to be used in classroom reading and writing activities and to promote independent reading;
- launching of a wide range of initiatives and events designed to encourage schools to promote reading opportunities and independent reading in partnership with families, publishers and bookshops, philanthropic foundations, and private and public organisations;
- supporting the reading promotion initiatives launched by public libraries and local community associations;
- promoting literacy projects in health centres and hospitals in partnership with doctors' and nurses' associations, and with public and private sponsorship; and,
- launching campaigns about the advantages of reading, including advertising in the media and on national TV; and
- conducting and supporting research studies on reading promotion and the assessment of reading literacy proficiency, including external evaluation studies on the impact of the National Reading Plan.

FIGURE 5.3

Mean score and 95% confidence interval on the PISA science scale, 2006



Countries are ranked in descending order of mean score.

Source: OECD, *Education at a Glance* (2008).

5.4 Equity in the Current Distribution of Educational Output

Following the publication in December 2001 of the first PISA results many countries have embarked on structural reforms and have introduced programmes designed to enhance the quality of student learning and reduce inequities in basic education. Portugal is a case in point. Efforts are under way to improve the quality of pre-schooling and basic education. Quality assurance mechanisms have been introduced and new education standards have been developed. Initial teacher training has been restructured and the professional upgrading of existing teachers also has been given renewed attention (Campos, 2008). This is particularly important because teachers need to be involved and broadly supportive if the education reforms are to be successful. The emphasis on improving education quality is common across European school systems, although the specific strategies being used vary.

A particular challenge for Portugal is that not only is its average score poor but the distribution of scores is skewed to the bottom end of the scale. The distribution of student achievement scores by levels is as important an indicator of current output as the average score for the country as a whole. While in some countries 15 per cent or more of the students reached the two highest levels of proficiency in science literacy, in Portugal only 3.1 per cent of 15 year-olds achieved Level 5 and 6 literacy skills. Almost a quarter of all students (24.5%) scored at Level 1 or below, while another 28.8 per cent scored at Level 2. The distributions of scores by levels were similar for

the 2000 and 2003 tests. This is worrying because it means that over 50 per cent of today's Portuguese youth are classified as low skilled in the key subjects of reading literacy, mathematics and science. This result carries important implications for Portugal's future economic prospects because workers with skills below Level 3 will have great difficulty competing in the global knowledge economy.

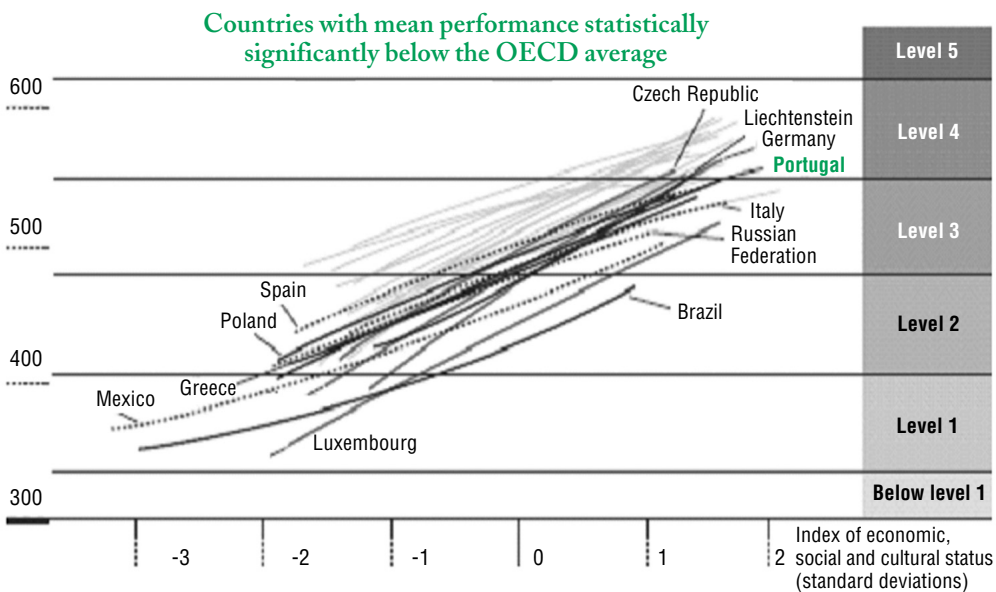
The skewed distribution of student achievement scores in Portugal has important implications for equity and efficiency in the school system because the students with low scores overwhelmingly come from families with parents who themselves have received little formal schooling. Young people from such homes often will be at a disadvantage, for example in terms of a supporting literacy environment and high educational aspirations, compared with students from homes where at least one parent has graduated from high school or attended university. Thus in Portugal educational disadvantage is closely related to the socio-economic status of families, so that inequalities will tend to reproduce themselves. Raising the general level of literacy in the adult population is therefore an important factor in the effort to improve the quality of education for the current school-age population.

Figure 5.4, drawn from an analysis of data from the 2000 cycle of the PISA assessment of literacy levels of 15-year-olds, reveals a relatively high degree of social inequality in students' literacy scores. More specifically, the reading proficiency of Portuguese youth is highly conditioned by their social background. Students coming from socially disadvantaged homes achieve much lower average scores than their more advantaged peers. Comparative analysis of the PISA data suggests that reducing the level of social inequality in reading practices and hence educational outcomes is one of the most effective ways of improving overall scores. Portugal's National Reading Plan is an important element in the strategies being pursued to achieve this goal.

FIGURE 5.4

Students' home background and their literacy proficiency

Socio-economic gradients for each country showing the relationship between student performance and socio-economic background



Source: OECD PISA database, 2001, Table 8.1.

5.5 Average Age of Current Adult Cohorts

The 2008-based EU population projections – the EUROPOP2008 convergence scenario – show the total population of Portugal rising gradually from 10,617,000 in 2008, reaching 11,317,000 in 2035 and thereafter gradually inching back to reach 11,264,000 on 1st January 2060 (Eurostat, 2008). What this population projection does not reveal, however, is that the overall increase in population size is projected to depend entirely on net immigration into the country. Table 5.1 shows the demographic balance for the period 2008-2060 for all EU-27 countries. The data show, for Portugal, that cumulative deaths will by far exceed cumulative births, so that natural change in the population is negative. This negative growth will only be balanced by significant net immigration. Not only is there uncertainty about the size of the net flows of migration 50 years into the future but also about the skill mix these future net migration flows might bring. Countries with a developed knowledge economy might succeed in attracting well-educated and creative knowledge workers from abroad. But other countries may find that they will attract migrants with relatively low levels of skill. What the future holds for Portugal in this respect is uncertain.

The population of Portugal is also projected to become older with the median age projected to rise from 40.4 years in 2008 to 47.9 years in 2060. The share of people aged 65 years or over in the total population is projected to more than double, while the population aged between 0 and 14 years is expected to decrease by 12 per cent over the period. Whereas in 2008 there are four persons of working age (15-64 years old) for every person aged 65 years or over; in 2060 the ratio is expected to be 2 to 1. The average age of the Portuguese workforce is elevated already today. This age is projected to increase further due to the combined effect of the existing structure of the population, persistently low fertility and continuously increasing number of survivors to higher ages.

This population scenario presents Portugal with serious challenges. Continuing to increase the quality and quantity of current education output will be important but is likely insufficient unless it is supplemented with a parallel effort to upgrade the skills of the current workforce as part of a true lifelong learning strategy.

TABLE 5.1

Demographic balance in the EU and EES countries, 2008-2060

	Estimated population	Cumulative births	Cumulative deaths	Natural change	Cumulative net migration	Total change	Projected population
	1-1-2008			2008-2059			1-1-2060
	in thousand			in thousand			in thousand
European Union-27	495,394.0	250,897.1	298,799.9	-47,902.8	58,227.4	10,324.6	505,718.5
Belgium	10,656.2	6,453.5	6,472.1	-18.6	1,657.2	1,638.6	12,294.8
Bulgaria	7,642.2	2,739.2	4,940.6	-2,201.4	43.9	-2,157.5	5,484.7
Czech Republic	10,345.9	4,364.0	6,433.0	-2,069.0	1,236.8	-832.1	9,513.8
Denmark	5,475.8	3,321.0	3,259.8	61.2	383.1	444.4	5,920.1
Germany	82,179.1	32,205.8	51,693.1	-19,487.3	8,067.4	-11,419.8	70,759.3
Estonia	1,338.6	621.9	827.6	-205.7	-0.6	-206.3	1,132.3
Ireland	4,414.8	3,784.9	2,307.8	1,477.2	860.2	2,337.3	6,752.1
Greece	11,216.7	4,997.6	6,944.3	-1,946.7	1,847.9	-98.8	11,117.9
Spain	45,283.3	23,164.0	28,060.1	-4,896.1	11,525.5	6,629.4	51,912.6
France	61,875.8	40,885.0	35,273.7	5,611.3	4,312.5	9,923.8	71,799.6
Italy	59,529.0	25,452.8	37,412.0	-11,959.2	11,819.8	-139.4	59,389.6
Cyprus	794.6	582.7	453.1	129.6	396.1	525.8	1,320.3
Latvia	2,269.1	870.6	1,453.0	-582.4	-4.3	-586.7	1,682.4
Lithuania	3,365.4	1,331.4	2,145.2	-813.8	-4.0	-817.8	2,547.7
Luxembourg	482.2	353.2	289.3	63.9	185.6	249.5	731.7
Hungary	10,045.4	4,154.8	6,477.1	-2,322.3	993.6	-1,328.7	8,716.7
Malta	410.5	187.4	242.8	-55.4	49.6	-5.8	404.7
Netherlands	16,404.3	9,076.4	9,388.2	-311.8	503.7	191.9	16,596.2
Austria	8,334.3	4,102.5	4,878.7	-776.1	1,479.1	703.0	9,037.3
Poland	38,115.6	14,910.8	22,417.5	-7,506.7	530.0	-6,976.7	31,139.0
Portugal	10,617.4	4,938.2	6,602.8	-1,664.6	2,312.0	647.4	11,264.8
Romania	21,423.4	8,211.6	13,066.8	-4,855.1	353.2	-4,501.9	16,921.4
Slovenia	2,022.6	816.4	1,251.5	-435.1	191.0	-244.1	1,778.6
Slovakia	5,398.8	2,116.6	3,222.6	-1,106.0	254.6	-851.4	4,547.3
Finland	5,299.8	2,999.0	3,226.8	-227.8	329.9	102.0	5,401.8
Sweden	9,182.9	5,896.4	5,400.3	496.1	1,196.0	1,692.1	10,875.0
United Kingdom	61,270.3	42,359.1	34,660.3	7,698.9	7,707.5	15,406.4	76,676.7
Norway	4,737.2	3,306.2	2,692.2	614.0	685.6	1,299.6	6,036.8
Switzerland	7,591.4	4,166.4	4,321.2	-154.8	1,756.5	1,601.7	9,193.1

Source: Eurostat, *Statistics in Focus No. 72/2008*.

5.6 Quality of the Current Workforce

On average across OECD countries, the proportion of 25-34 year-olds having attained at least upper secondary education is 23 percentage points higher than that of 55-64 year-olds. The proportion of the Portuguese population that has attained at least upper secondary education has risen from 13 per cent among 55 to 64 year-olds to 45 per cent among 25 to 34 year-olds. For neighbouring Spain the increase was from 28 per cent with at least upper secondary education among 55 to 64 year-olds to 65 per cent among 25 to 34 year-olds. This puts the Spanish workforce in a better position compared to the Portuguese workforce.

Overall, 57 per cent of the Portuguese population aged 25-64 years has only completed primary education, and another 15 per cent have completed only lower secondary education. Thus only 28 per cent of the population aged 25-64 years has

completed at least upper secondary education. The proportion of the population with a tertiary qualification also is comparatively low, at 20 per cent of those aged 25-34 years, compared with only 7 per cent of those aged 55-64 years. These proportions are changing quite rapidly, however, as the effects of educational reforms and the expansion of the system take hold. Of those aged 25-34 years 44 per cent of Portuguese had at least completed upper secondary education, compared with only 12 per cent among those aged 55-64 years.

Paradoxically, the significant improvements achieved during recent years in the level of educational attainment of the Portuguese population have not diminished but rather reinforced the concern with literacy. This is because literacy demands are not static but evolve with social, economic and especially technological change. The importance of literacy skills will increase further with the advent of the knowledge economy and the diffusion of information technologies in Portuguese society. In addition to the abilities normally associated with literacy – mainly reading and writing – people will need more complex analytical and problem-solving skills. In past years having a low level of literacy – being able to read simple prose – may have been a sufficient condition for many jobs in the Portuguese labour market. In the future knowledge economy the country seeks to build, however, this will no longer be the case because knowledge jobs will often require higher-order literacy, analytical and problem-solving skills.

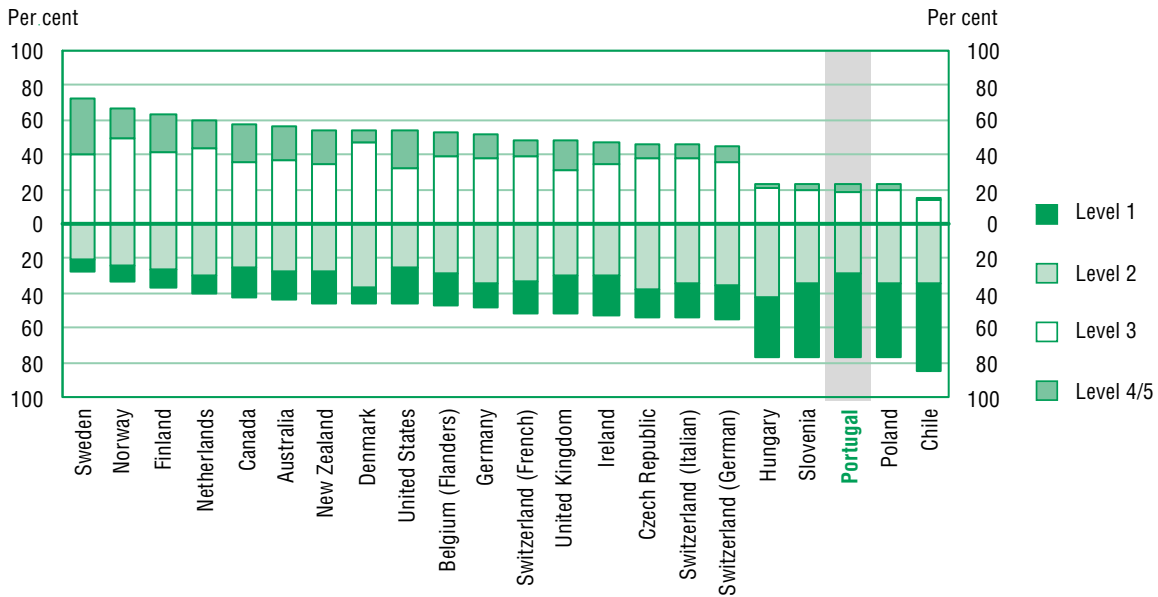
Unfortunately the evidence on the level of literacy skill in the adult population of Portugal is not encouraging. The results from the IALS survey, conducted between 1994 and 1998, indicate that although adults facing serious literacy problems can be found in any country, the patterns differ greatly from one to another. Figure 5.5 shows the country mean scores on the prose literacy scale. The results clearly document the comparatively low average level of literacy skill in the Portuguese population as well as the large score differences between percentiles.

Some countries have large proportions of their adult population with high literacy levels. Finland, the Netherlands, Norway and Sweden typically have the largest proportions at Levels 3 and 4/5 (see Box 5.2 for a description of the literacy levels). Only the prose literacy scale is presented here since comparatively the results on the document and quantitative scales are similar (see OECD and Statistics Canada, 2000). Sweden stands out with the highest proportion of adults at Levels 4/5 on all three scales. There are also countries that just as regularly have large proportions at low levels of literacy: Chile, Poland, Portugal and Slovenia. Other countries such as New Zealand, the three language groups in Switzerland and the United States fall into the middle.

FIGURE 5.5

Comparative distribution of literacy levels

Per cent of population aged 16 to 65 at each prose literacy level, 1994-1998



Countries are ranked by the proportion in Levels 3 and 4/5.

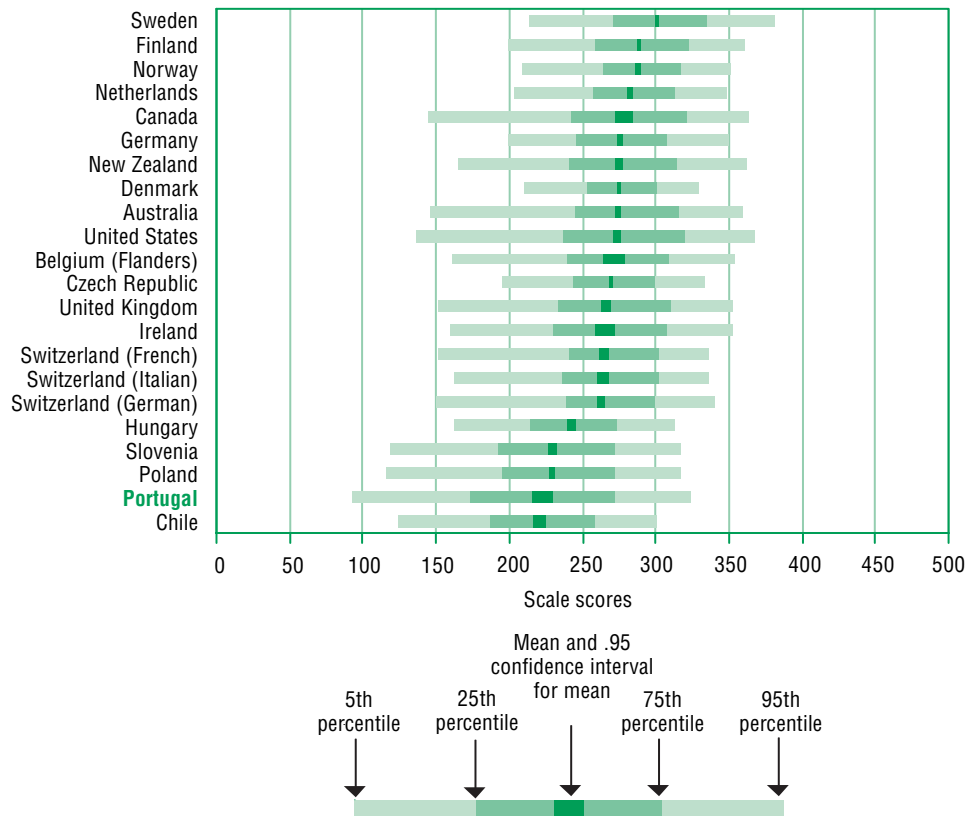
Source: International Adult Literacy Survey, 1994-1998

Figure 5.6 presents literacy scores on an alternative scale which is useful for understanding the relative inequalities in the skill distribution of different countries. It allows for a comparison of the range of scores on a scale from 0 to 500 points. Countries with small ranges suggest a lower level of inequality in the distribution of skills, whereas countries with large ranges suggest high levels of inequality. The data reveal that the spread in Nordic countries along with other Northern European countries is tight compared with other countries. In Portugal and the United States, at the other extremes, the results are more dispersed, suggesting higher levels of inequality in the distribution of literacy skills. Other countries fall in between.

FIGURE 5.6

Average literacy scores and percentile distribution

Mean scores with .95 confidence interval and scores at the 5th, 25th, 75th and 95th percentiles on the prose scale, population aged 16 to 65, 1994-1998



Countries are ranked in descending order by mean prose literacy scores.

Source: International Adult Literacy Survey, 1994-1998.

Box 5.2

Measuring functional literacy in the International Adult Literacy Survey (IALS), 1994-1998, and the Adult Literacy and Life Skills (ALL) Survey, 2003

The IALS and ALL surveys were large-scale co-operative efforts undertaken by governments, national statistics agencies, research institutions and multi-lateral agencies. These are the world's first internationally comparative survey of adult skills undertaken in several rounds of data collection between 1994 and 2003. Among other skills, the surveys measured two types of functional literacy skills, namely prose and document literacy. These are defined as follows:

Prose literacy – the knowledge and skills needed to understand and use information from texts including editorials, news stories, brochures and instruction manuals.

Document literacy – the knowledge and skills required to locate and use information contained in various formats, including job applications, payroll forms, transportation schedules, maps, tables and charts.

There is no arbitrary standard distinguishing adults who have or do not have these skills. For example, many previous studies have distinguished between adults who are either “literate” or “illiterate”. Instead, these studies conceptualized and measured proficiency along a continuum (denoted on a scale ranging from 0 to 500 points) and this is used to identify how well adults use information to function in society and the economy. Each score denotes a point at which a person has an 80 per cent chance of successfully completing tasks that are associated with a similar level of difficulty. For the prose and document literacy domains as well as the numeracy domain, experts have defined five broad levels of difficulty, each corresponding to a range of scores.

On the prose scale used to denote functional literacy the levels are defined as follows:

Level 1 (0-225 points) – Most of the tasks in this level require the respondent to read relatively short text to locate a single piece of information which is identical to or synonymous with the information given in the question or directive. If plausible but incorrect information is present in the text, it tends not to be located near the correct information.

Level 2 (226-275 points) – Some tasks in this level require respondents to locate a single piece of information in the text; however, several distractors or plausible but incorrect pieces of information may be present, or low-level inferences may be required. Other tasks require the respondent to integrate two or more pieces of information or to compare and contrast easily identifiable information based on a criterion provided in the question or directive.

Level 3 (276-325 points) – Tasks in this level tend to require respondents to make literal or synonymous matches between the text and information given in the task, or to make matches that require low-level inferences. Other tasks ask respondents to integrate information from dense or lengthy text that contains no organizational aids such as headings. Respondents may also be asked to generate a response based on information that can be easily identified in the text. Distracting information is present, but is not located near the correct information.

Level 4 (326-375 points) – These tasks require respondents to perform multiple-feature matches and to integrate or synthesize information from complex or lengthy passages. More complex inferences are needed to perform successfully. Conditional information is frequently present in tasks at this level and must be taken into consideration by the respondent.

Level 5 (376-500 points) – Some tasks in this level require the respondent to search for information in dense text which contains a number of plausible distractors. Others ask respondents to make high-level inferences or use specialized background knowledge. Some tasks ask respondents to contrast complex information.

For more details, see: OECD and Statistics Canada (2000; 2005).

5.7 Equity in the Stocks of Workforce Skill

It is of interest to note that secondary graduates in Portugal do relatively well on the prose and quantitative scales, but less well on the document scale. This suggests that there may be differences in the strength of the association between educational attainment and literacy outcomes. But home background factors such as reading behaviours at home also influence this relationship.

The education of parents is another contributing factor. Figures 5.7 displays, for young persons aged 16 to 25, the relationship between literacy scores and parents’ education measured in years. Figure 5.8 shows the corresponding results for the population aged 26 to 65. Each line was drawn to encompass the range of parents’ education within each country from the 10th to the 90th percentiles. The lines are commonly referred to as socio-economic gradients, and they are useful because they portray the relative level of literacy skill in each country, and the extent of inequalities among people with differing socio-economic backgrounds (Box 5.3).

Box 5.3

What Do the Gradients Show?

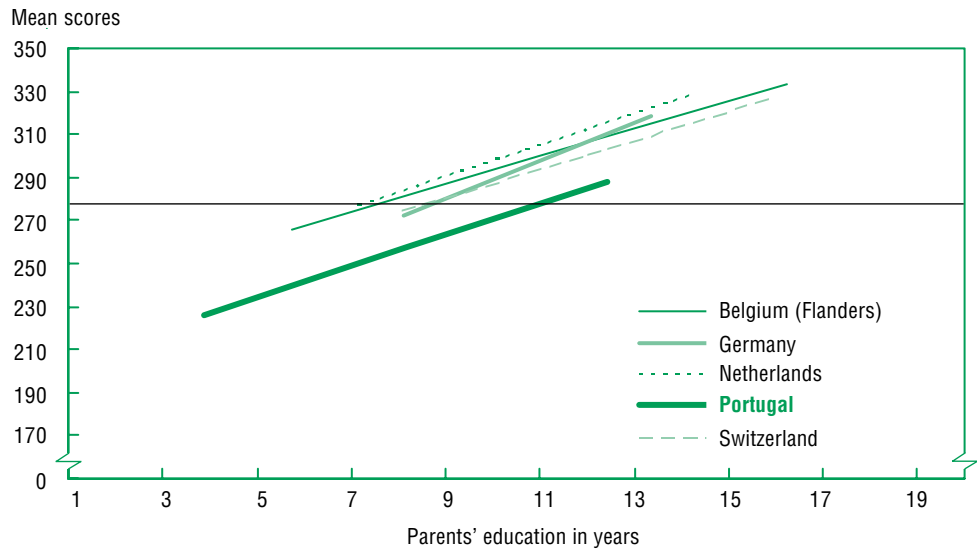
Gradients are indicators of the extent of inequalities among different subpopulations.

Shallow gradients indicate that there are relatively few inequalities in literacy levels among young and mature adults with differing levels of parental education. Steep gradients indicate greater inequalities.

FIGURE 5.7

Socio-economic gradients for document literacy scores

Relationship between respondent's document literacy scores and parents' education in years, population aged 16 to 25, 1994-1998



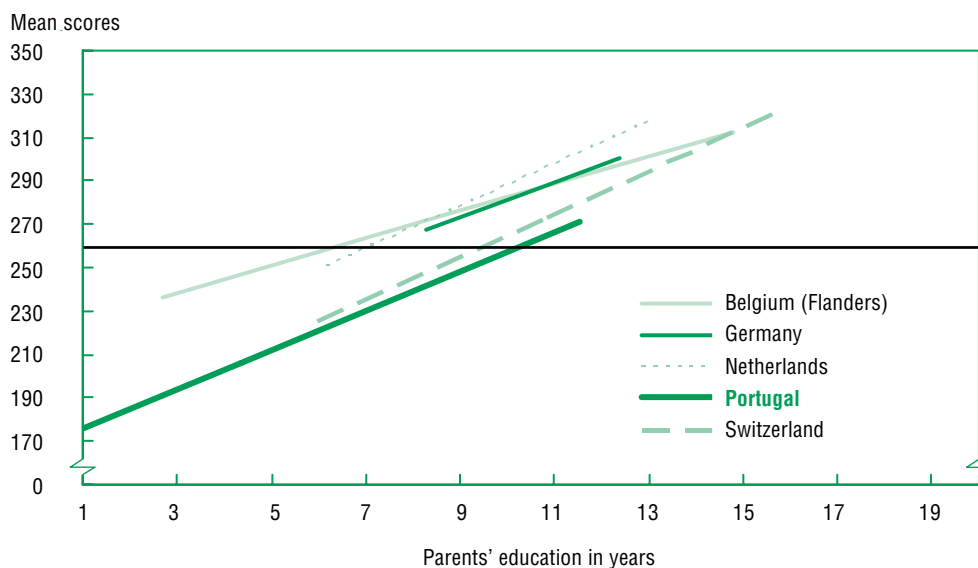
Source: International Adult Literacy Survey, Statistics Canada.

The results for young adults show considerable differences among countries in the strength of the relationship between parents' education and respondent's levels of literacy skills, indicating substantial variation in socio-economic inequality. The gradients for the group of countries including Belgium (Flanders), Germany, the Netherlands, Portugal and Switzerland are of similar steepness. However, the literacy scores are on average about 20 points higher at all levels of parental education. These countries also vary considerably among each other in their level of proficiency, with a range of about 30 points between Portugal with the lowest level and the Netherlands at the highest level. The results show that young people in Portugal on average have low literacy skills and that much of the differences are attributable to differing levels of parental education. Figure 5.8 shows the gradients for adults aged 26 to 65 for the same group of countries. The gradients for the adult population are in most respects similar to those for youth, except that they are steeper overall, and their convergence is not as pronounced. The conclusion is that countries with high average literacy skill have been successful in bolstering the literacy levels of their least educated citizens.

FIGURE 5.8

Socio-economic gradients for document literacy scores

Relationship between respondent's document literacy scores and parents' education in years, population aged 26 to 65, 1994-1998



Source: International Adult Literacy Survey, Statistics Canada.

5.8 Labour Market Outcomes of Education and Literacy

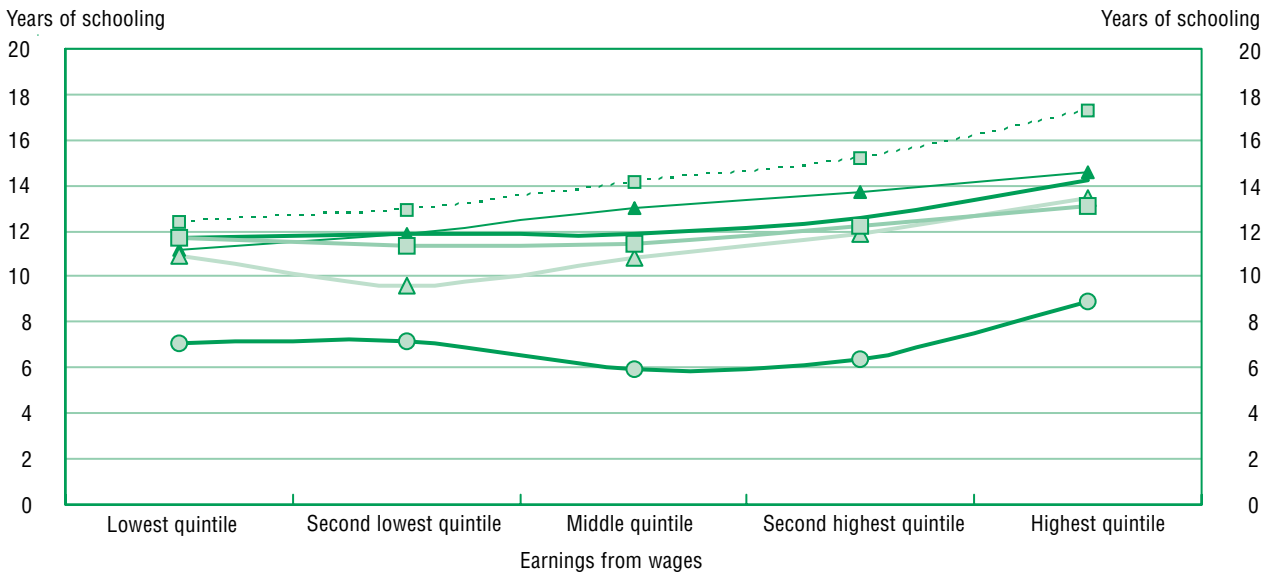
Portugal appears to be somewhat of an outlier with respect to the distributional effects of literacy on wage earnings. Unlike most other OECD countries, wage earnings in Portugal do not necessarily increase with the level of literacy skills, or with the level of education. The unadjusted relationships are non-linear and confounded.

For Portugal, the relationships between level of education and wages (Figure 5.9) and between literacy skills and wages (Figure 5.10) are weakly negative in the lower to middle part of the distribution but then rise sharply for the most highly educated and skilled. Thus Portuguese adults with tertiary education indeed earn much more than the less educated. But adults with upper secondary education do not necessarily earn more than their less educated counterparts. This is an indication that the highly skilled jobs are reserved for the most educated, while for the rest of the labour market, attained skills, as reflected by educational attainment or as measured on the prose literacy scale, have little or no impact on how well paying jobs are allocated.

FIGURE 5.9

Education and wage earnings

Years of schooling by wage earnings (in quintiles), workforce aged 16 to 65 years, 1994-1998



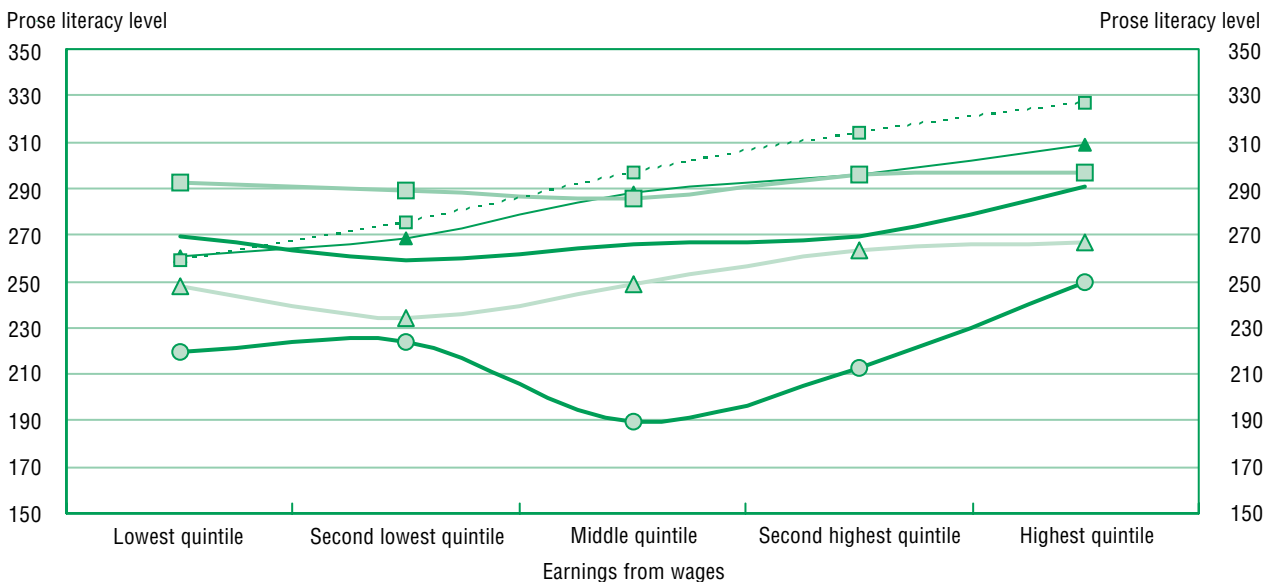
Source: International Adult Literacy Survey, Statistics Canada.

- ▲— Canada
- Switzerland
- △— Italy
- Norway
- - - □ - - - United States
- Portugal

FIGURE 5.10

Literacy and wage earnings

Mean scores on the prose literacy scale ranging from 0 to 500 points, by wage earnings (in quintiles), workforce aged 16 to 65 years, 1994-1998



Source: International Adult Literacy Survey, Statistics Canada

This finding is consistent with the observation that a large number of jobs in the Portuguese labour market are low skilled in terms of reading engagement (approximately 71%, see Table 6.2 in Chapter 6). For these jobs, formal education can be thought of as having little to no value in terms of labour productivity. Thus among low to semi-skilled jobs, experience, seniority and/or other structural factors are more likely to be important in determining wage earnings in Portugal.

Literacy skills do matter at the top end of the wage distribution. It can be seen from Table 5.2 that Portuguese adults who score at Level 3 or higher have twice the odds of being in the top 20 per cent of earners, even after adjusting for the effect of education, gender and age, all of which also have substantial effects. In a manner consistent with the raw associations, Table 5.2 helps to confirm that adults in the middle and next to highest quintile are about equally likely to be either low (Level 1 or 2) or medium to high skilled (Level 3 or higher) on the prose scale. The result is similar when education is considered. Accordingly, neither literacy skills nor education have statistically significant effects on wage earnings when the middle portion of the wage distribution is examined.

TABLE 5.2

Adjusted effect of literacy on wage earnings

Adjusted odds ratios showing the likelihood of being in a certain quintile vis-a-vis the bottom 40 per cent of earners, by age, gender, education and literacy skills on the prose scale, workforce aged 16-65 years, Portugal, 1998

	Middle quintile		Next highest quintile		Highest quintile	
	Odds ratio	p-value	Odds ratio	p-value	Odds ratio	p-value
Age						
Age	1.0	0.43	1.2	0.00	1.4	0.00
Age-squared	1.0	0.60	1.0	0.00	1.0	0.00
Gender						
Women	1.0		1.0		1.0	
Men	1.3	0.30	3.4	0.00	3.7	0.00
Education						
Primary or less	1.0		1.0		1.0	
Lower secondary	0.6	0.17	0.9	0.85	2.2	0.00
Upper secondary	1.3	0.59	1.8	0.21	3.6	0.00
Post-secondary	0.7	0.60	1.0	0.93	5.6	0.00
Literacy skills on the prose scale						
Level 1, 2	1.0		1.0		1.0	
Level 3, 4/5	0.5	0.11	0.7	0.30	2.0	0.02

Source: International Adult Literacy Survey, Statistics Canada.

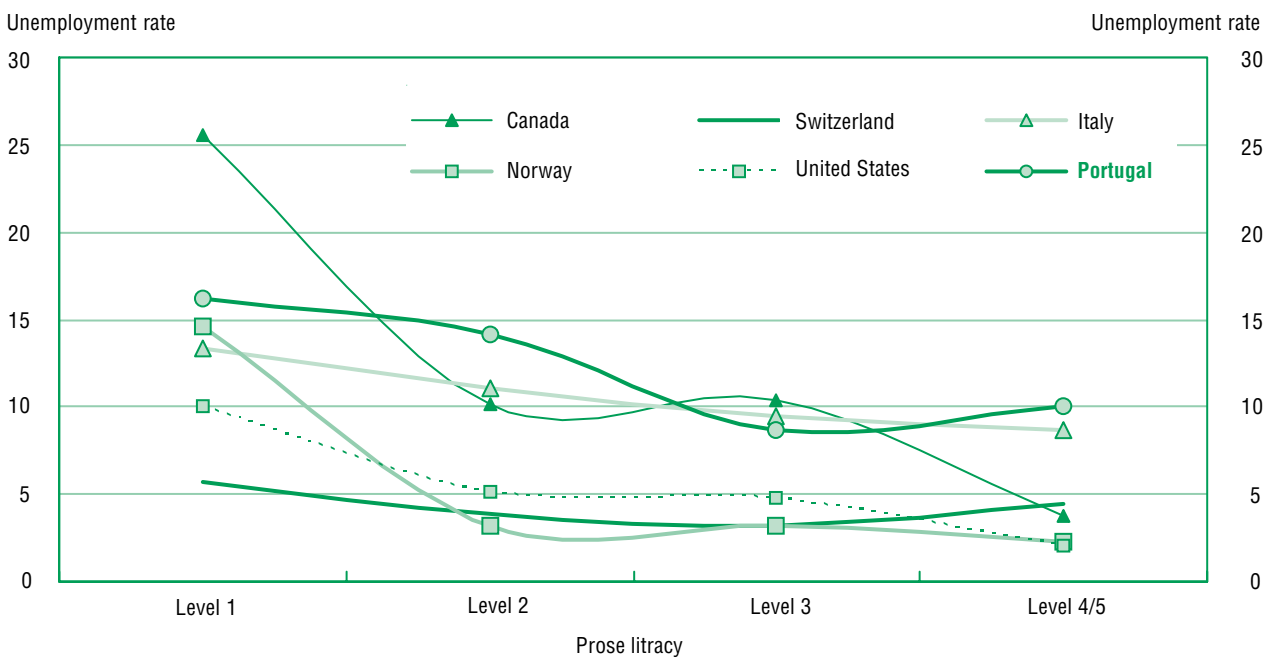
In contrast to the confounded relationship with wage earnings, literacy is consistently negatively related to unemployment. Figure 5.11 shows that in Portugal the unemployment rate among adults who feature adequate levels of literacy (i.e., Level 3 or higher) is about 1.6 to 1.8 times lower than among adults who are deemed to be low literate (Level 1 or 2). This is consistent with the data presented in Table 6.1 in Chapter 6, which indicates that much of the job growth in Portugal between

1998 and 2006 was concentrated among the skilled occupations. Thus, as the number of skilled occupations continues to grow, it is likely that this relationship will strengthen and that observed differences between those who have literacy skills and those who do not will be exacerbated. Adults with medium to high literacy skills (i.e. Level 3 or higher) will be much better prepared to find employment, while those with inadequate skills (i.e., Level 1 or 2) will find it increasingly difficult to do so.

FIGURE 5.11

Literacy and unemployment

Unemployment rate in per cent by literacy skill levels on the prose scale, workforce aged 16 to 65 years, 1994-1998



Source: International Adult Literacy Survey, Statistics Canada.

The next chapter will examine the evidence about the match or mismatch between the supply of and demand for literacy skills on the Portuguese labour market.

The Role of Literacy Skills in the Economy

The supply of, and demand for, literacy skills should be understood within a broad political and economic framework including industrial policies and labour market structures that foster demand, on the one hand, and lifelong learning policies and education structures that shape supply, on the other. In short, developing and maintaining a skilled labour force is not only the concern of education policy. For example, if a country chooses to pursue industrial and employment strategies that are based on low-skill equilibrium then the demand for skill may stall, and even deskilling may occur. Policies that stimulate both supply and demand are thus equally vital, if countries are to grow high value added production and improve standards of living.

In recent years, however, the OECD policy discourse has tended to take the demand for skills for granted, and instead has focused almost exclusively on the production of skills in the initial education system, particularly literacy and numeracy skills, and on the consequences of skill deficits for individual workers and the economy as a whole. This discourse about the need to continuously upgrade skills was subsumed under the banner of lifelong learning in the mid-1990s. As a consequence of this focus the discussion has been largely limited to individuals' literacy deficits and the need to expand continuing education and training opportunities for the work force. The overall picture is, however, more complicated than this because much less thought has been given to how a lack in demand for skill in the labour market restricts large population groups from engaging in value added production and the further development of skills through flexible adult learning (Krahn and Lowe, 1998).

Industrial and wider structural policies can have an important influence on skill demand. The demand side should not be taken for granted because structural conditions may in fact allow for employers to compete on the basis of low-skill strategies, whereas elsewhere high-skill strategies are used to pursue the production of similar goods and services (Brown, Green and Lauder, 2001). Hence employers need to be encouraged to also invest in the supply of skill. This requires support by means of a sophisticated public policy framework. High-skill strategies stimulate demand for skill and also influence the adult learning behaviours of both individuals and employers. Such strategies can impact the evolution of adult skill profiles, especially over the long run.

This chapter examines dimensions of a supply and demand framework for skill. First, the trend toward a growing demand for skills in the Portuguese labour market is considered. Second, the supply of functional literacy skills in Portugal is assessed from a comparative perspective. Third, the interaction between the demand and supply

is examined so as to assess levels of match and mismatch on the labour market. The conditions needed to foster the development of skill supply via adult learning policies and structures are also studied. Finally, the chapter will consider several social capital indicators and explore how these might relate to human capital production in Portugal.

6.1 Demand for Functional Literacy Skills in Modern Labour Markets

Functional literacy is a foundational component of the complete set of capabilities which individuals need in order to use resources in ways that enable the realisation of things that matter to them (Sen, 1999). While modern society as a whole places ever growing demand on the skill sets of people, the world of work constitutes a growing source of demand for functional literacy. The evidence indicates that technological changes continuously affect production and occupational structures, thus creating demand for a skill oriented labour force (OECD, 2001; 2008). Similar to the impact of the printing press, electricity and the steam engine, general purpose technologies such as ICTs bring with them deep structural change (Aghion and Howitt, 1998). In short, continuing advances in the ICT sector, combined with other technological developments, are transforming economies and increasing the demand for foundation skills, including functional literacy.

The increasing demand for skill is driven by both shifts in the composition of industrial and occupational structures as well as a general skill intensification of work tasks among already existing industries and occupations. Skill-biased technical change is a reality in the manufacturing as well as primary and agricultural sectors. There is also a structural shift in many economies toward an expanded high-skill services sector.

As shown in Table 6.1, the proportion of high-skill service occupations in Portugal such as managers, professionals and associate professionals has increased by about 5 per cent between 1998 and 2006, rising from 21 to 26 per cent. Meanwhile, the proportion of unskilled and semi-skilled occupations contracted over the same period, from 13 to 12 per cent and from 66 to 62 per cent, respectively. The pattern is similar in a range of OECD countries. Beyond the shift to skilled occupations, the upskilling of work tasks is a widespread feature occurring within most industries (Berman, Bound and Machin, 1998; Machin, Ryan and Van Reenan, 1996) and occupations (Green, Ashton, Burchell, Davies and Felstead, 2000; Massé, Roy, and Gingras, 2000; Osterman, 1995). According to Gee, Hull and Lankshear (1996) and Frank, Holland and Cooke (1998), even the way work is organised has fundamentally changed.

As part of this structural shift, communication based practices have in many countries become increasingly critical for the production of goods and services, including traditional ones. Not least, text based practices such as reading and using ICTs are on an increasing trend in most industries and occupations. Indeed data indicate that job tasks have become more reading intensive across a range of occupations and industries. Using measures reflecting the frequency and variety of reading practices at work, it can be seen from Table 6.2 that in a brief time interval of 5-10 years, reading intensity is on an upward trend in most occupational and industrial groups and in most countries surveyed.

Italy is an exception, suggesting that trends in the demand structure for functional literacy skills should not be taken for granted. Although the proportion of skilled occupations increased by 12 per cent in Italy between 1998 and 2006 (see Figure 6.1), the supply of literacy skills did not, pointing to a growing level of mismatch

between the skills needed to be productive and the skills available. In Switzerland an increase in skill demand is only apparent for white-collar, high-skill occupations, but reading intensities among the semi-skilled and unskilled occupations were already among the highest in 1994. Trend data are not available for Portugal, but the data for 1998 reveal that the levels of reading intensity were rather close to Italy and among the lowest for the countries surveyed. This latter observation is in line with the data in Table 6.1, which shows that Portugal had a relatively low number of skilled occupations.

TABLE 6.1

Proportion of the working age population in different occupations (ISCO), 1998 and 2006

	Percentages, by ISCO groups									Total workforce		Population 25-64			
	Legislators; senior officials; managers	Professionals	Technicians; associate professionals	Clerks	Service workers	Skilled agricultural and fishery workers	Craft and related trades workers	Plant and machine operators; assemblers	Elementary occupations	Skilled occupations	Semi-skilled occupations	Unskilled occupations	Skilled occupations	Semi-skilled occupations	Unskilled occupations
OECD countries	ISCO 1	ISCO 2	ISCO 3	ISCO 4	ISCO 5	ISCO 6	ISCO 7	ISCO 8	ISCO 9	ISCO 1-3	ISCO 4-8	ISCO 9	ISCO 1-3	ISCO 4-8	ISCO 9
Australia															
2006	13	19	14	13	14	2	12	7	6	46	48	6	51	44	6
1998	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m
Austria															
2006	7	10	21	13	13	5	14	7	11	38	52	11	40	49	11
1998	7	10	14	14	14	6	17	9	9	31	60	9	33	57	10
Belgium															
2006	12	21	12	15	11	2	10	8	9	45	46	9	46	45	9
1998	11	19	10	16	11	2	13	8	9	41	51	9	42	49	9
Canada															
2006	9	17	15	14	14	2	10	10	8	41	50	8	46	47	7
1998	10	16	14	14	14	3	10	11	9	39	52	9	43	50	8
Czech Republic															
2006	7	11	22	7	12	2	18	14	7	39	53	7	40	52	7
1998	7	10	18	8	12	2	21	13	9	35	57	9	37	55	9
Denmark															
2006	3	15	22	12	17	1	12	8	11	40	49	11	45	46	9
1998	3	13	16	13	16	1	13	9	15	32	53	15	36	51	13
Finland															
2006	10	17	17	7	16	5	12	8	8	44	48	8	48	45	7
1998	8	17	17	9	12	7	12	10	8	42	50	8	44	49	7
France															
2006	9	13	18	12	13	4	12	9	10	40	50	10	42	48	10
1998	8	11	17	14	13	5	14	11	8	36	56	8	37	55	8
Germany ¹															
2006	5	14	22	12	12	2	15	7	10	42	49	10	44	47	9
1998	5	13	20	13	12	1	18	8	10	38	52	10	40	50	9

TABLE 6.1 (continued)

Proportion of the working age population in different occupations (ISCO), 1998 and 2006

	Percentages, by ISCO groups										Total workforce			Population 25-64		
	Legislators; senior officials; managers	Professionals	Technicians; associate professionals	Clerks	Service workers	Skilled agricultural and fishery workers	Craft and related trades workers	Plant and machine operators; assemblers	Elementary occupations	Skilled occupations	Semi-skilled occupations	Unskilled occupations	Skilled occupations	Semi-skilled occupations	Unskilled occupations	
	ISCO 1	ISCO 2	ISCO 3	ISCO 4	ISCO 5	ISCO 6	ISCO 7	ISCO 8	ISCO 9	ISCO 1-3	ISCO 4-8	ISCO 9	ISCO 1-3	ISCO 4-8	ISCO 9	
OECD countries																
Hungary																
2006	8	13	14	9	15	3	18	12	8	34	58	8	35	57	8	
1998	6	12	13	9	13	4	23	11	9	31	60	9	33	58	9	
Iceland																
2006	9	17	15	8	20	5	13	6	7	41	51	7	47	48	5	
1998	8	12	14	9	18	7	17	7	9	34	57	9	39	54	7	
Ireland																
2006	15	17	6	13	17	1	14	8	9	38	53	9	41	50	9	
1998	18	15	5	13	14	1	13	10	10	39	52	10	43	48	9	
Italy²																
2006	9	10	22	11	11	2	17	9	9	40	50	9	41	49	10	
1998	3	10	15	14	16	4	19	9	9	28	62	9	30	61	9	
Luxembourg¹																
2006	6	21	18	17	9	2	10	6	10	46	44	10	47	43	10	
1998	6	16	19	16	9	3	14	7	10	41	49	10	43	47	10	
Netherlands³																
2006	11	19	18	12	14	2	9	6	10	47	43	10	53	40	7	
1998	13	17	18	12	13	2	10	6	8	48	43	8	54	40	7	
Norway																
2006	6	12	25	7	24	3	11	7	5	43	52	5	48	48	4	
1998	11	9	20	10	20	4	11	8	7	40	53	7	44	51	5	
Poland																
2006	6	15	11	7	12	14	16	10	8	33	60	8	35	58	8	
1998	7	10	12	8	10	18	19	9	8	28	63	8	31	61	8	
Portugal																
2006	8	9	9	10	15	10	20	8	12	26	62	12	28	60	12	
1998	7	6	8	9	13	11	23	9	13	21	66	13	24	63	13	
Slovak Republic																
2006	5	11	19	6	14	1	19	15	10	35	55	10	37	54	10	
1998	6	10	17	8	13	2	22	14	10	32	58	10	34	56	10	
Spain																
2006	8	12	12	9	15	3	17	9	15	32	54	15	33	52	14	
1998	9	12	9	10	14	5	17	11	14	29	57	14	32	55	13	

TABLE 6.1 (concluded)

Proportion of the working age population in different occupations (ISCO), 1998 and 2006

Percentages, by ISCO groups															
	Legislators; senior officials; managers	Professionals	Technicians; associate professionals	Clerks	Service workers	Skilled agricultural and fishery workers	Craft and related trades workers	Plant and machine operators; assemblers	Elementary occupations	Total workforce			Population 25-64		
										ISCO 1-3	ISCO 4-8	ISCO 9	ISCO 1-3	ISCO 4-8	ISCO 9
OECD countries	ISCO 1	ISCO 2	ISCO 3	ISCO 4	ISCO 5	ISCO 6	ISCO 7	ISCO 8	ISCO 9	ISCO 1-3	ISCO 4-8	ISCO 9	ISCO 1-3	ISCO 4-8	ISCO 9
Sweden ¹															
2006	6	18	19	9	20	1	9	11	6	43	51	6	46	49	6
1998	6	16	20	11	19	1	11	11	7	41	52	7	43	50	6
Switzerland															
2006	6	18	21	12	14	4	15	5	5	46	49	5	49	46	6
1998	6	16	20	14	14	4	15	5	5	42	52	5	45	49	6
Turkey															
2006	6	11	6	7	8	9	28	14	11	23	66	11	26	64	11
1998	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m
United Kingdom ²															
2006	15	14	13	14	17	1	9	7	11	42	47	11	44	50	6
1998	15	16	9	17	15	1	12	8	8	39	53	8	43	50	7
United States ⁴															
2006	15	21	a	13	28	1	10	12	a	36	64	a	39	61	a
1998	15	15	3	14	26	4	2	17	4	33	63	4	37	59	4
OECD average															
2006	8.1	14.9	16.7	10.8	14.8	3.3	13.7	8.6	9.1	39.8	51.2	9.1	42.5	49.2	8.4
OECD average															
1998	8.2	13.0	14.7	11.8	13.8	4.3	15.7	9.3	9.2	35.9	54.9	9.2	38.6	52.7	8.7
Change 2006-1998															
	0.0	1.9	2.1	-1.0	0.9	-0.9	-2.0	-0.7	-0.2	3.9	-3.8	-0.2	3.9	-3.6	-0.3

m Data is not available.

1. 1999 instead of 1998.

2. Italy: change in survey methodology between 1998 and 2006 affects comparability. United Kingdom: change in national occupation coding frame in 2000 affects comparability for ISCO.

3. 2000 instead of 1998.

4. ISCO groupings 3 and 9 in 2006 are not separated and thus distributed among remaining ISCO classification.

Note: OECD averages are calculated for countries with data for both years and all ISCO groups.

Source: OECD, Network B special data collection, Supply of Skills Working Group.

OECD, *Education at a Glance* (2008, p. 47).

The following table shows that Portuguese workers are among those with the lowest levels of skill use on the job. Thus, Portuguese workers are at great risk of losing what new literacy skills they had through lack of use.

TABLE 6.2

Reading intensity index showing the frequency and variety of reading engagement at work on a scale of 0 to 100 points, by occupation and industry, workforce aged 16 to 65 years, 1994-1998 and 2003

A. Occupation									
	Total	White-collar high-skill	White-collar low-skill	Blue collar high-skill	Blue-collar low-skill	Skilled occupations	Semi-skilled occupations	Unskilled occupations	
		ISCO 1-3	ISCO 4-5	ISCO 6-7	ISCO 8-9	ISCO 1-3	ISCO 4-8	ISCO 9	
Canada									
1994	69	80	65	61	60	80	63	59	
2003	73	83	66	70	59	83	67	53	
Change	3.7	3.0	1.4	8.5	-0.9	3.3	3.7	-5.8	
United States									
1994	70	82	67	63	56	82	64	—	
2003	73	83	67	66	62	83	66	59	
Change	2.5	0.3	0.0	3.2	6.2	0.3	2.3	—	
Switzerland (German-French)									
1994	73	79	70	70	61	79	69	62	
2003	75	81	69	69	60	81	69	56	
Change	1.9	1.8	-1.2	-1.3	-1.6	1.8	-0.6	-5.3	
Italy									
1998	62	75	64	54	47	75	59	46	
2003	60	70	63	48	44	70	55	41	
Change	-2.4	-4.6	-1.4	-5.4	-3.8	-4.6	-4.1	-5.3	
Norway									
1998	69	79	65	64	54	79	64	47	
2003	72	82	69	70	61	82	68	56	
Change	3.4	2.2	3.8	5.3	6.7	2.2	4.3	9.0	
Portugal									
1998	58	75	60	49	48	75	53	48	
B. Industry									
	Agriculture, hunting, forestry and fishing	Mining and quarrying	Manu-facturing	Electricity, gas and water	Construc-tion	Wholesale and retail trade	Transport, storage and communi-cations	Financing, insurance, real est. and bus. services	Community, Social and Personal Services
Canada									
1994	64	64	65	82	62	66	67	78	72
2003	64	78	70	80	71	67	76	80	76
Change	0.3	14.2	5.2	-2.2	8.4	0.6	9.3	2.4	4.2
United States									
1994	56	80	67	74	62	68	72	74	73
2003	60	67	74	80	66	68	76	79	75
Change	3.9	-13.5	7.0	5.5	3.8	0.0	3.9	4.7	1.8
Switzerland (German-French)									
1994	70	68	75	70	72	71	74	76	74
2003	69	74	75	84	73	70	75	79	75
Change	-0.9	6.4	0.7	13.7	0.8	-0.6	0.7	2.8	0.3

TABLE 6.2 (concluded)

Reading intensity index showing the frequency and variety of reading engagement at work on a scale of 0 to 100 points, by occupation and industry, workforce aged 16 to 65 years, 1994-1998 and 2003

	B. Industry								
	Agriculture, hunting, forestry and fishing	Mining and quarrying	Manufacturing	Electricity, gas and water	Construction	Wholesale and retail trade	Transport, storage and communications	Financing, insurance, real est. and bus. services	Community, Social and Personal Services
Italy									
1998	54	76	56	69	54	65	66	75	65
2003	46	57	57	64	52	57	60	75	61
Change	-7.6	-19.3	1.2	-5.0	-1.8	-8.0	-5.5	-0.6	-4.1
Norway									
1998	64	72	68	71	65	67	69	73	70
2003	—	82	71	76	67	72	75	78	73
Change	—	9.9	2.3	4.6	1.2	5.6	5.3	5.1	2.4
Portugal									
1998	46	—	52	76	48	63	57	75	62

— Data is not available.

Source: International Adult Literacy Survey, 1994-1998; Adult Literacy and Lifeskills survey, 2003.

6.2 The Supply of Functional Literacy Skills in Portugal

This section situates the supply of functional literacy skills in Portugal within a comparative perspective. The results from IALS presented in section 5.7 of the previous chapter clearly document the existence of significant numbers of adults with low literacy skills in all countries for which data are available, even in the most economically advanced ones.

Although one's occupational trajectory and any educative pursuits undertaken later in life can have substantial impacts on functional literacy, initial formal schooling remains the key determinant of functional literacy skills (Desjardins, 2003). Basic schooling is designed to provide the instruction needed to become a fluent reader. The comparative supply of literacy skills can therefore be a circumstance of country differences in educational attainment, because these differ widely (OECD, 2008). As mentioned in Chapter 5, about 80 per cent of the Portuguese population aged 16 to 65 has not completed upper secondary school. In contrast, only 25 per cent of adults in Sweden have not attained upper secondary education. In this regard, it is not surprising that Sweden has higher average literacy scores and features higher proportions of the population at Levels 3 and 4/5 than Portugal.

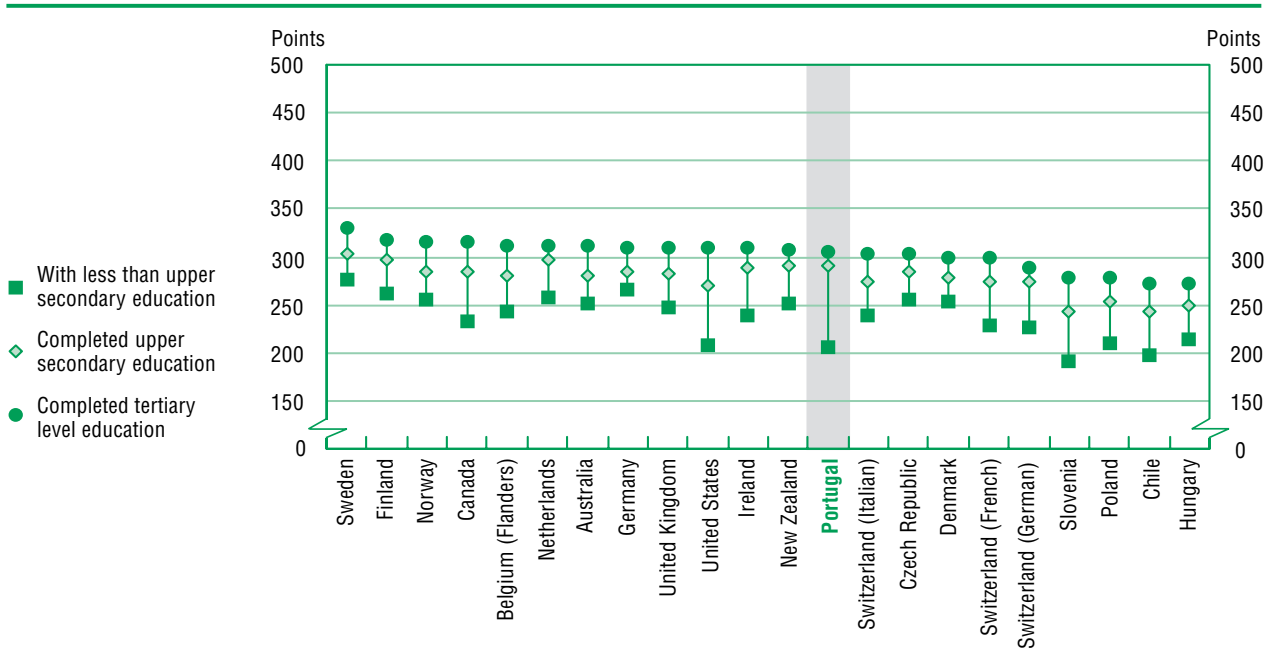
Two key and complementary insights can be deduced from Figure 6.1. Firstly, Portuguese adults with an upper secondary education or higher, score average and in some cases higher compared with similarly educated adults in other countries. This reinforces the idea that low literacy performance in Portugal is linked to low overall levels of educational attainment. The situation is more complex, however, as revealed by a second insight gleaned from Figure 6.1. Among those with less than upper secondary education, the literacy performance of Portuguese adults is comparatively low, but similar to the situation in Chile, Poland, Slovenia and the United States,

which are all countries with pronounced inequalities, not only in the distribution of literacy but also in the distribution of income. This suggests that the life chances of adults with low levels of education are more restricted in terms of accessing literacy rich environments and, by extension, the concomitant benefits. It also suggests that there are other factors beyond schooling that influence literacy skills, which might be functioning better in some countries than others – for example, targeted access to adult learning opportunities for low educated adults in the case of the Nordic countries (see Section 6.4).

FIGURE 6.1

Literacy by level of education

Mean prose score on a scale with range 0-500 points, by level of educational attainment, population aged 16 to 65 years, 1994-1998



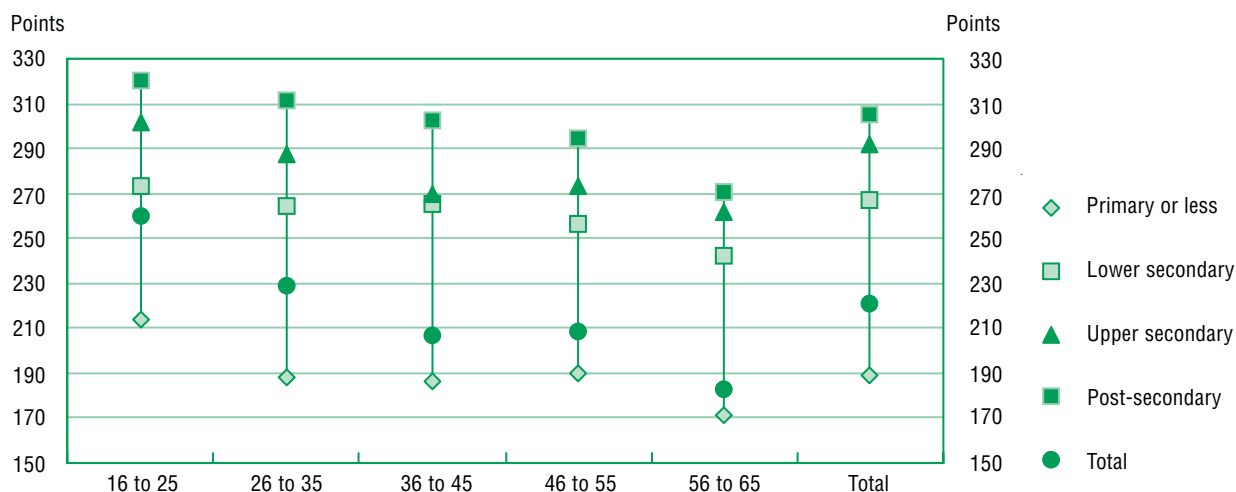
Source: International Adult Literacy Survey, 1994-1998.

Taking a closer look at the interaction of literacy skills and education with age, one of two things or both can be inferred from Figure 6.2. Firstly, there may have been improvements to the quality of schooling in Portugal over the last few decades. This is indicated by the fact that at the time of the survey in 1998, youth aged 16 to 25 years with only lower secondary schooling, performed better than adults aged 56 to 65 with upper secondary schooling. Alternatively, older adults may have lost some of the skills they initially gained at a young age because of a lack of use in either daily life or at work, or both. Lack of demand for skill is linked to low use, which in turn is a factor in de-skilling processes. Hence working in low skill jobs may have contributed to a depreciation of the skills that adults had at one time attained upon graduation. It can also be argued that youth nowadays are to a greater extent introduced to a wider range of literacy activities – as with the National Reading Plan, starting at an earlier age too – requiring literacy skills including those outside of schooling, thereby fostering a stronger development of those skills. It is not possible to verify either of these alternative explanations with the available data, but it is likely that all of them are to a certain extent valid.

FIGURE 6.2

Literacy by age and level of education

Mean scores on the prose scale literacy scale by age groups, in years, and level of educational attainment, Portugal, 1998



Source: International Adult Literacy Survey, 1998.

6.3 Match-Mismatch of Demand and Supply of Skill

Having briefly considered in turn the dynamics of the demand and supply of literacy skills in the Portuguese economy, this section considers the interaction between the two. Is there a match or mismatch between the day-to-day literacy related requirements of workers (demand) and their actual skills (supply), as measured by IALS? This is an important issue for at least two reasons. Firstly, there is a tendency for the policy discourse to focus on individual deficits and remedial education and training, but the issue is broader than this. Deficits and the need for training depend on the requirements of the job (i.e., the supply depends on the demand). Secondly, skills are under-utilised in many labour markets (see Krahn and Lowe, 1998; Boothby, 1999). That is, many workers have high literacy and numeracy skills but are not required to fully exploit them at work. This is referred to as a “skill surplus”, which is today a reality in many OECD economies. On the other hand, there are also many workers who have low skills but engage relatively often in literacy and numeracy related activities for productive purposes. This is referred to as a “skill deficit”, which can have a negative impact on productivity growth and the long term economic and social health of a country. Skill surpluses and deficits should be seen as labour market inefficiencies that can be addressed by policies seeking to foster demand and supply, respectively.

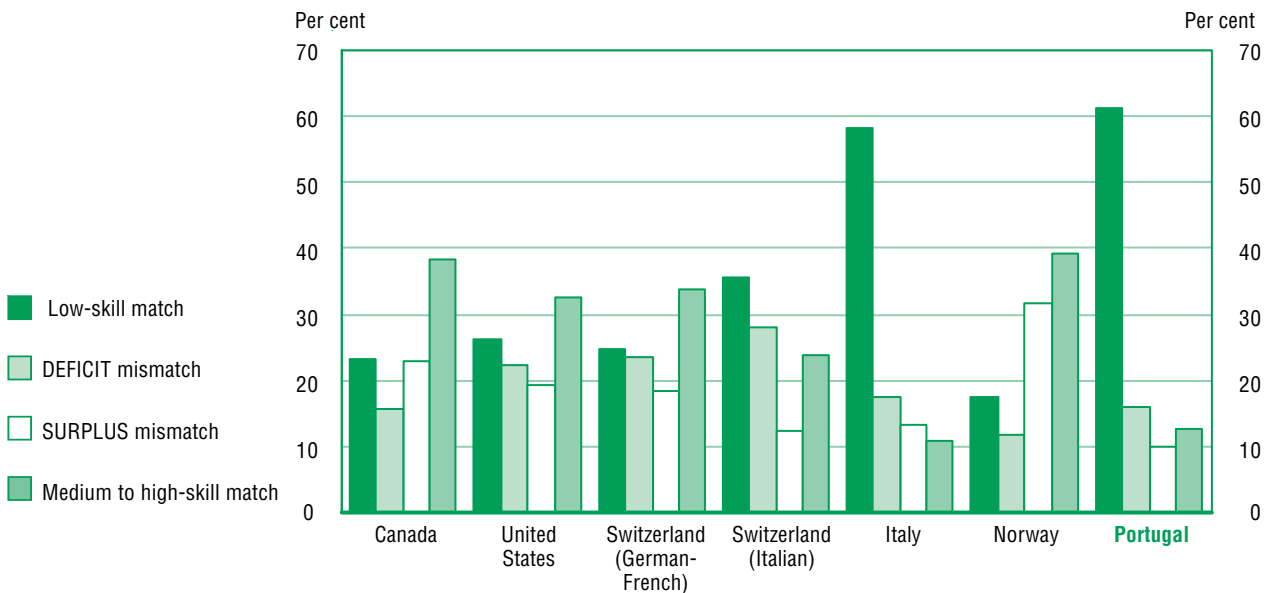
Figure 6.3 displays the distribution of match-mismatch by country. A number of important observations are worth noting. First, the proportion of matches is consistently about 60 per cent in all countries. This is not surprising, since one would expect that over time workers with higher skills would find their way into jobs requiring more skills, whereas those with few skills would not move up. In Italy and Portugal, the proportion of matches reaches over 70 per cent. These two countries, however, also feature the highest proportion of low skill matches, around 60 per cent. This means that in both countries, about three-fifths of the economy is in low-skill equilibrium. Under conditions of an open, globalised economy with competitor

countries that have large, youthful skilled and cheap surpluses of labour (e.g., China and India), this is at best a risky strategy for sustaining standards of living in the long term.

FIGURE 6.3

Match-mismatch between supply and demand for skills on the labour market

Per cent of matches-mismatches on the labour market between skill supply as measured by prose literacy skill and skill demand as measured by a reading index based on the frequency and variety of reading engagement at work, by country, workforce aged 16 to 65 years, 1998 and 2003



Sources: For Portugal: International Adult Literacy Survey, 1998; For other countries: Adult Literacy and Lifeskills survey, 2003.

Skills deficits are apparent in every country but the extent of the problem varies. As can be seen from Figure 6.3, IALS data show that approximately 10 to 30 per cent of the workforce can fall into this category, depending on the country. Some countries have a comparatively high skills deficit. This is indicated by a high proportion of workers with low functional literacy skills who are working in jobs that require medium-high to high-engagement in literacy related tasks. Presumably, a certain level of mismatch is expected in the labour market but whether 10 per cent, for example, is normal cannot be answered with certainty. Higher rates, however, are likely to suggest a need for adjustment; in particular, the need for an increased effort to train persons in those jobs. In Portugal, the proportion of workers that are estimated to be in a skill deficit situation is just over 15 per cent. Expanding access to flexible education and training modules specifically designed for working adults is therefore a consideration.

The reserve of skills, or skills surplus, as defined by the number of workers with medium to high literacy skills employed in jobs requiring low to medium-low engagement also varies substantially by country. The IALS data show that Norway has a reserve of skills equivalent to approximately 30 per cent of working adults whereas Italy's reserve is just over 10 per cent and Portugal's reserve is about 10 per cent. Average literacy performance at the country level tends to be related to the size of the skill reserve. While a skills surplus is good for growing knowledge economies in the long run, a lack of skill demand in the workplace may be problematic because it exposes workers to the risk of skill loss.

This follows from the “use it or lose it” hypothesis (OECD and HRDC, 1997; Krahn and Lowe, 1998). Literacy skills are like muscles that develop if you use them, otherwise they can be lost. In this way they are not only a function of schooling but also of a wide range of other practices that occur over the lifespan including social and cultural practices, and not least, work practices such as engagement in literacy related tasks (see Desjardins, 2004). Practice engagement is important to nurture and develop skills (Reder, 2009). Therefore, workers who are deprived of the opportunity to perform complex literacy tasks may lose some of their skills proficiency in the medium to longer term.

6.4 Development of Skill Supply through Adult Learning

As the demand for functional literacy increases, it is clear that the processes involved in generating and maintaining functional literacy skills need to be better understood. Otherwise there are risks that threaten standards of living. Formal and initial modes of education such as primary, secondary and tertiary education are, as pointed out in Chapter 5, instrumental in forming a nation’s stock of foundation skills. Yet initial education systems are static structures, and out of reach for most adults beyond regular school-age. Flexible and dynamic structures that foster continued investment in adult learning are necessary so that the adult population can keep up and respond to structural changes and concomitant changes in skill demand. This is especially relevant for rapidly ageing societies, notably Portugal’s.

A review of national and supranational policy documents reveals the increasing importance attributed to the role of adult learning in promoting the well being of nations and individuals. Policy makers in all OECD countries seem to agree with Tony Blair that, “education is the best economic policy we have” (Martin, 2003, p.567). Economic concerns are heightened by current demographic changes that are resulting in a rapidly ageing workforce. In response the EU identified lifelong learning as a key instrument in making Europe the strongest knowledge economy in the world by 2010, and has established ambitious long-term training goals for all member countries (European Commission, 2007).

While the new economy may promise increased productivity and an improved standard of living, there is a growing awareness that it also introduces a set of transitions and adjustment challenges for individuals. These have the potential to cause the permanent exclusion or marginalisation of segments of the population and exacerbate socio-economic divisions. On this point, policy makers can draw on welfare researchers who maintain that adult learning is part of the solution to the exclusion dilemma (Esping-Andersen, 1996, p.259). Adult learning can be seen to promote competencies that help individuals adapt to the demands of the new economy and enable full participation in economic and social life.

The promise of adult learning in fostering economic growth and higher living standards has resulted in the development of major national and supranational policy driven surveys focusing on the extent and distribution of adult learning, the performance of adult education and training systems, and the effect of different policy levers on participation (e.g., Chisolm, Larson and Mossoux, 2004; OECD and Statistics Canada, 2005).

A comparison of the available data reveals some interesting national differences on the average level of participation in adult learning, and who participates or doesn’t. Two important findings stand out from Table 6.3. First, there are substantial differences in adult education participation rates between countries at comparable stages in the

modernisation process and with quite similar economies. Based on a review of comparative evidence (see Desjardins, Rubenson and Milana, 2006, p.36), the countries can be grouped as follows:

- Group 1: A small group of countries have overall participation rates that are consistently close to or exceeding 50 per cent. Denmark, Finland, Iceland, Norway and Sweden comprise this group.
- Group 2: Countries of Anglo-Saxon origin including Australia, Canada, New Zealand, the United Kingdom and the United States have overall participation rates that fall into the 35-50 per cent range. A few of the smaller Northern European countries – including Luxembourg, the Netherlands and Switzerland – are also among this group.
- Group 3: Countries in this group have overall participation rates ranging between 20-35 per cent. It features the remainder of Northern European countries including Austria, Belgium (Flanders), and Germany. Also among this group is the Czech Republic and Southern European countries including France, Italy, Slovenia and Spain.
- Group 4: This is comprised group of countries with rates consistently below 20 per cent. It includes the remaining Southern European countries, namely Greece and Portugal, as well as some Eastern European countries such as Hungary and Poland.

Second, the IALS data on adult education participation, presented in Table 6.3, suggest that while age, family background, educational attainment and work related factors are linked to inequality in participation in all countries, the level of inequality varies substantially between them (OECD and Statistics Canada, 2000; 2005). In particular, inequalities are substantially lower in the Nordic countries than in other ones. In contrast, inequalities in Portugal are particularly sharp. Structural analyses of the data suggest that patterns of inequality in adult learning mirror broader structural inequalities in society, e.g., inequalities in income, educational opportunities, especially for working adults, and skill attainment (OECD and Statistics Canada, 2000).

TABLE 6.3

Participation in organised adult learning

Per cent of adults¹ aged 16 to 65 participating in formal adult learning during the year preceding the interview, by country groupings and various classification variables, multiple sources and years ranging from 1994-2003

	Group 1 (close to or > 50%)										Group 2 (35-50% range)						
	United States ^{1,3}	United Kingdom ^{1,2}	Switzerland ^{1,3}	New Zealand ¹	Netherlands ²	Luxembourg ²	Canada ^{1,3}	Bermuda ³	Australia ¹	Austria ²	Sweden ^{1,2}	Norway ^{1,2,3}	Iceland ²	Finland ^{1,2}	Denmark ^{1,2}	Eurobarometer EU15+1 average ⁵	IALS average
Overall participation rate	33	37	57	51	39	36	47	47	51	39	36	47	37	38	38	38	41
Age																	
16 to 25	42	47	68	41	44	46	56	46	44	41	46	56	44	59	48	49	33
26 to 35	43	42	63	57	41	41	56	41	41	47	41	56	42	36	46	50	47
36 to 45	41	41	64	61	47	40	47	40	42	47	40	47	42	44	40	44	45
46 to 55	34	34	55	57	36	31	44	31	33	36	31	44	33	36	31	39	41
56 to 65	18	21	32	35	26	18	29	18	15	24	17	28	15	24	17	25	27
Gender																	
Women	36	36	59	52	40	35	52	35	36	40	35	52	36	35	36	47	41
Men	37	37	55	49	39	38	42	38	41	39	38	42	38	41	39	49	41
Parent's education^f																	
Less than upper secondary	31	49	49	48	39	34	40	34	28	48	34	40	28	34	34	44	27
Upper secondary	44	60	60	54	50	41	51	41	42	54	41	51	42	49	49	52	63
Higher than upper secondary	53	69	69	57	58	48	60	48	56	57	48	60	56	46	46	62	68
Education^g																	
Less than upper secondary	22	21	41	35	28	24	19	24	21	28	24	19	21	20	26	38	14
Upper secondary	40	37	56	52	40	38	32	38	32	40	38	32	32	42	44	51	32
Higher than upper secondary	58	52	75	67	55	56	60	56	56	67	56	60	56	51	53	65	63
Functional literacy level^{h,8}																	
Level 1	17	23	23	29	15	14	22	14	17	29	14	22	17	22	22	30	14
Level 2	31	47	47	41	39	27	38	27	28	41	27	38	28	30	30	36	31
Level 3	47	69	69	52	51	43	50	43	43	52	43	50	43	42	42	52	48
Level 4/5	59	77	77	60	64	61	65	61	53	60	61	65	53	54	54	68	64

TABLE 6.3 (continued)

Participation in organised adult learning

Per cent of adults¹ aged 16 to 65 participating in formal adult learning during the year preceding the interview, by country groupings and various classification variables, multiple sources and years ranging from 1994-2003

	Group 1 (close to or > 50%)										Group 2 (35-50% range)						
	IALS average	Eurobarometer EU15+1 average ⁵	Denmark ^{1,2}	Finland ^{1,2}	Iceland ²	Norway ^{1,2,3}	Sweden ^{1,2}	Austria ²	Australia ¹	Bermuda ³	Canada ^{1,3}	Luxembourg ²	Netherlands ²	New Zealand ¹	Switzerland ^{1,3}	United Kingdom ^{1,2}	United States ^{1,3}
	Per cent																
Employment status																	
Unemployed	27	34	53	30	75	38	44	41	29	32	30	11	38	33	30	26	
Employed	44	43	60	70	68	53	59	43	43	49	42	45	43	46	57	48	
Retired	10	14	18	17	100	7	16	19	9	24	11	8	13	20	9	13	
Student ⁸	63	89	89	92	100	44	40	94	96	83	66	100	66	49	56	42	
Outside labour force (eg. homemaker)	15	15	22	29	43	14	25	29	13	35	23	29	23	25	14	14	
Occupation¹⁰																	
Blue-collar low-skill	26	29	42	48	69	37	39	10	26	23	26	14	29	28	37	22	
Blue-collar high-skill	30	31	47	50	57	43	42	32	33	29	29	30	40	36	37	29	
White-collar low-skill	42	47	63	68	66	47	52	44	44	40	40	53	43	44	58	44	
White-collar high-skill	58	59	73	82	74	63	68	61	55	61	53	58	48	56	69	65	
Immigration status⁶																	
Foreign-born	34	34	42	55	61	41	41	38	31	31	51	33	45	27	45	30	
Native-born	37	37	47	57	58	47	47	52	38	38	45	38	37	46	45	42	
Language status⁸																	
First and official language(s) not the same	31	31	46	46	66	42	42	37	29	29	39	28	42	33	41	29	
First and official language(s) same	37	37	57	57	58	47	47	52	38	38	48	39	38	44	45	43	
Community size																	
Rural	33	34	49	63	65	45	49	39	34	47	31	42	36	37	46	43	
Urban	38	39	60	51	70	50	52	39	37	47	38	35	38	44	45	34	

TABLE 6.3 (continued)

Participation in organised adult learning

Per cent of adults¹ aged 16 to 65 participating in formal adult learning during the year preceding the interview, by country groupings and various classification variables, multiple sources and years ranging from 1994-2003

	Group 3 (20-35%)										Group 4 (below 20%)				
	Portugal ^{2,4}	Poland ¹	Hungary ¹	Greece ²	Chile ¹	Spain ²	Slovenia ¹	Italy ^{1,2,3}	Ireland ^{1,2}	Germany ^{2,4}	France ²	Czech Republic ¹	Belgium ^{2,4}	EU Barometer EU15 average ⁵	IALS average
Overall participation rate	13	15	20	17	20	27	34	23	24	35	23	26	32	37	33
Age															
16 to 25	25	18	28	26	25	40	43	34	29	46	39	24	40	47	42
26 to 35	18	17	28	26	25	38	46	28	27	41	25	34	34	42	43
36 to 45	12	18	20	18	21	29	39	25	25	40	21	29	38	41	41
46 to 55	7	11	16	11	12	15	28	18	18	34	22	30	28	34	34
56 to 65	1	3	3	3	7	8	9	9	9	16	8	9	18	21	18
Gender															
Women	13	13	21	13	20	26	32	19	25	32	20	22	29	36	36
Men	12	16	19	20	19	27	35	26	22	37	26	31	34	37	37
Parent's education^{6,7}															
Less than upper secondary															
Upper secondary															
Higher than upper secondary															
Education															
Less than upper secondary															
Upper secondary															
Higher than upper secondary															

TABLE 6.3 (continued)

Participation in organised adult learning

Per cent of adults¹ aged 16 to 65 participating in formal adult learning during the year preceding the interview, by country groupings and various classification variables, multiple sources and years ranging from 1994-2003

	Group 3 (20-35%)					Group 4 (below 20%)									
	Portugal ^{2,4}	Poland ¹	Hungary ¹	Greece ²	Chile ¹	Spain ²	Slovenia ¹	Italy ^{1,2,3}	Ireland ^{1,2}	Germany ^{2,4}	France ²	Czech Republic ¹	Belgium ^{2,4}	EU Barometer EU15 average ⁵	IALS average
Per cent															
Functional literacy level^{6,8}															
Level 1	8	8	11	11	19	15	8	9	10	35	46	19	26	34	15
Level 2	15	20	25	25	23	41	22	18	30	43	25	33	41	43	44
Level 3	23	35	40	40	15	62	39	30	3	6	4	5	14	14	10
Level 4/5	41	46	48	48	100	75	44	48	50	59	100	21	70	89	63
Employment status															
Unemployed	8	9	13	20	19	17	16	10	11	16	7	0	6	15	15
Employed	17	20	29	23	43	42	29	30	16	43	46	19	21	29	27
Retired	0	2	1	3	11	6	5	3	3	4	4	5	14	14	10
Student ⁹	100	19	30	100	100	88	100	50	59	100	100	21	70	89	63
Outside labour force (eg. Homemaker)	1	4	0	2	8	11	3	11	11	16	7	0	6	15	15
Occupation															
Blue-collar low-skill	11	11	13	10	12	18	13	17	17	25	18	19	21	29	26
Blue-collar high-skill	10	10	15	16	13	25	15	16	16	37	16	29	29	31	30
White-collar low-skill	23	18	25	27	30	47	27	38	38	41	26	23	50	47	42
White-collar high-skill	41	38	45	43	50	68	50	46	46	59	37	45	70	59	58
Immigration status⁶															
Foreign-born	3	3	24	31	31	23	29	26	26	29	23	13	13	34	34
Native-born	15	15	20	19	19	35	22	23	23	22	27	27	27	37	37
Language status⁶															
First and official language(s) not the same	11	11	11	13	13	23	23	18	18	28	24	24	24	31	31
First and official language(s) same	20	20	20	20	20	35	23	23	23	23	26	26	26	37	37

TABLE 6.3 (concluded)

Participation in organised adult learning

Per cent of adults¹ aged 16 to 65 participating in formal adult learning during the year preceding the interview, by country groupings and various classification variables, multiple sources and years ranging from 1994-2003

	Group 3 (20-35%)		Group 4 (below 20%)	
B. Country groupings 3 and 4				
	EU Barometer EU15 average ⁵	34	34	
	IALS average	38	38	
	Belgium ^{2,4}	30	30	
	Czech Republic ¹	21	21	
	France ²	22	22	
	Germany ^{2,4}	34	34	
	Ireland ^{1,2}	18	18	
	Italy ^{1,2,3}	19	19	
	Slovenia ¹	25	25	
	Spain ²	22	22	
	Chile ¹	9	9	
	Greece ²	10	10	
	Hungary ¹	14	14	
	Poland ¹	10	10	
	Portugal ^{2,4}	12	12	
		13	13	

Community size

Rural
Urban

Per cent

1. Data source is the International Adult Literacy Survey, 1994-1998. Adults aged 16 to 19 participating in full time studies (4 or more days per week) toward ISCED 0-3, and who are not financially supported by an employer or union are excluded. Similarly, adults aged 16 to 24 in full time studies toward ISCED 4-7 students, and who are not financially supported by an employer or union are excluded.
2. Data source is the Eurobarometer, 2003. For countries who participated in both the IALS, 1994-1998 and Eurobarometer, 2003, only the results of IALS are reported here so as to maintain best comparability with as many countries as possible. It was not possible to exclude full time students 16 to 24 years, which explains the slightly higher rates when compared to the IALS results. However, the general patterns among the various characteristics are very similar.
3. Bermuda, Canada, Italy, Norway, Switzerland and the United States participated in the Adult Literacy and Life skills (ALL) survey, 2003. To maintain as much comparability as possible however, the IALS results are reported for Canada, Norway, Switzerland, the United States, and Italy. Data source for Bermuda is ALL, 2003 - the same exclusion criteria as described in Note 1 is applied in defining the base population. It is noteworthy that Canada, Norway, Switzerland, and the United States all achieve rates near or exceeding 50 per cent in ALL 2003, signifying substantial improvements, particularly for Canada, Switzerland and the United States but due to changes in the questionnaire design, comparability with IALS is not guaranteed. Still, it could be argued that these countries should now be shifted to grouping 1. Similarly, Italy's participation rate dropped in the ALL study down to 19% providing grounds for it to be shifted to grouping 4 but this is not done here since it was chosen to report the IALS results instead.
4. Belgium (Flanders), Germany and Portugal also participated in the International Adult Literacy Survey (IALS), 1994-1998, but because certain questions included in this analysis were not asked, or deemed too incomparable, the Eurobarometer data, 2003 were reported instead.
5. The Eurobarometer average includes all original 15 member states plus Iceland.
6. The variables parents' education, functional literacy level, immigration and language status were not available in the Eurobarometer, 2003 dataset.
7. In the Eurobarometer, 2003 dataset the corresponding categories were actually defined using a total years of schooling variable as: 10 years or less; 11 to 13 years; 14 or more years; whereas in IALS and ALL the categories were defined using a 'highest level of education attained'.
8. The functional literacy measure is based on the prose literacy variable in IALS, which was defined as: the knowledge and skills needed to understand and use information from texts including editorials, news stories, brochures and instruction manuals (see Box 4.1 for further information on the level definitions).
9. As noted, it was not possible to exclude full time students aged 16 to 24 in the Eurobarometer, 2003 data which explains why there are 100 per cent of students reporting that they participated in some countries. Adults 16 to 65 who consider themselves as students do not necessarily report participating in organised forms of adult learning and education, however, because in some countries adults, especially youths 16 to 25 who are participating in formal schooling pathways are excluded from answering the question whereas in some countries this is not case. This highlights the difficulties of making all what counts as adult learning and education in each country strictly comparable, particularly among the 16 to 25 age group.
10. Occupational groups are defined as follows: 'white-collar high-skilled' include legislators, senior officials and managers and professionals, technicians and associate professionals; 'white-collar low-skilled' include service workers and shop and market sales workers and clerks; 'blue-collar high-skilled' include skilled agricultural and fishery workers and craft and related trades workers; and, 'blue-collar low-skilled' include plant and machine operators and assemblers and elementary occupations. These data are classified according to the International Standard Classification of Occupations (ISCO).

The comparatively higher and more equal participation in adult education in Nordic countries has prompted inquiries as to why this might be the case. While there is a distinctive and persistent pattern of non-participation which is similar to a range of other countries, the success of Nordic countries appears to lie precisely in their ability to overcome a variety of barriers to participation.

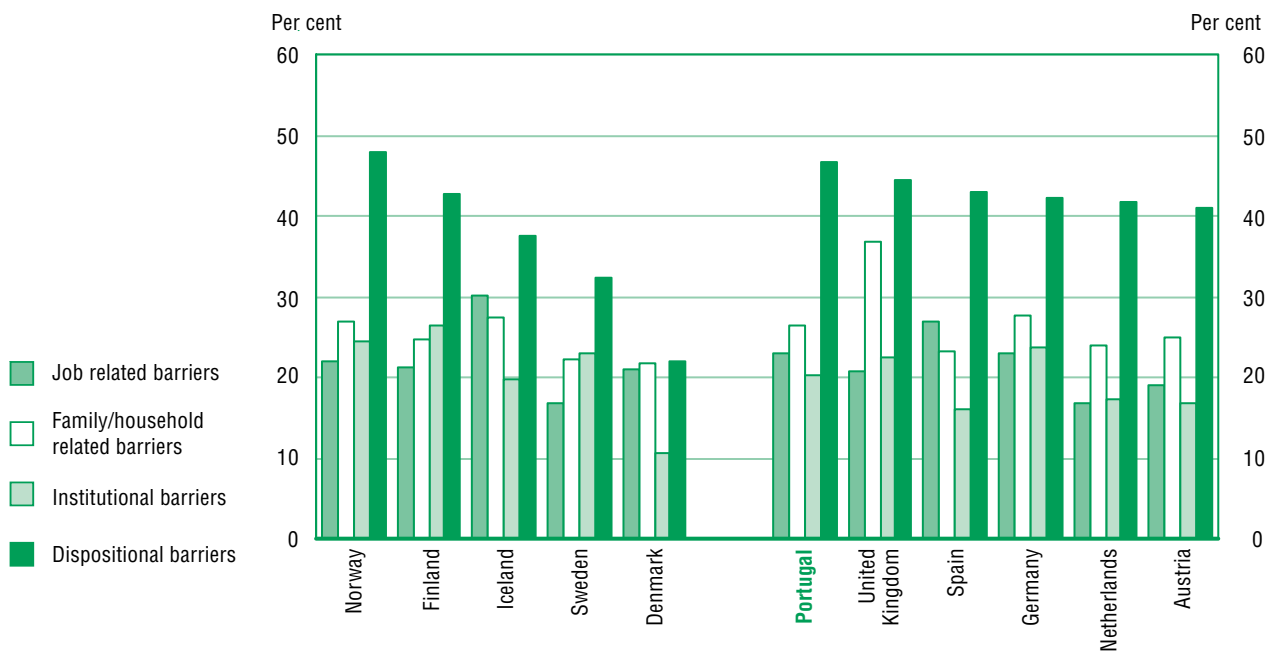
The Nordic countries have a long shared history of supporting and fostering a rich adult learning culture. Although various historical, social and cultural factors are behind this, Nordic countries also share a strong record of public policy that aims to promote adult learning, foster favourable structural conditions, target various barriers to participation, and not least ensure that disadvantaged groups have equal opportunity to take up adult learning. Together, observations indicate that a strong commitment to public strategies, policies, and structures that foster participation, especially among adults that would otherwise not participate, can be effective for increasing the take up of adult learning.

Empirical findings on barriers to participation suggest that the major difference between Nordic and other European countries are not the existence of barriers as such but the conditions that allow a person to overcome these. Data in Figure 6.4 from the Eurobarometer suggest that adults in Nordic and other European countries experience similar barriers to participation and nearly to the same extent. By and large adults seem to have mentioned situational and institutional barriers to approximately the same extent regardless of the country they inhabit.

FIGURE 6.4

Barriers to participation

Per cent of adults reporting specific types of barriers to participation, by country, 2003



Ranked by the proportion of adults reporting dispositionally related barriers.

Source: Eurobarometer survey data, 2003.

Note: Except for Group 1 (Denmark-DK, Finland-FI, Iceland-IS, Norway-NO, Sweden-SE), two countries are selected from each group outlined above as follows: Group 2 (the Netherlands-NL, the United Kingdom-UK); Group 3 (Austria-AT, Germany-DE); Group 4 (Portugal-PT, Spain-ES).

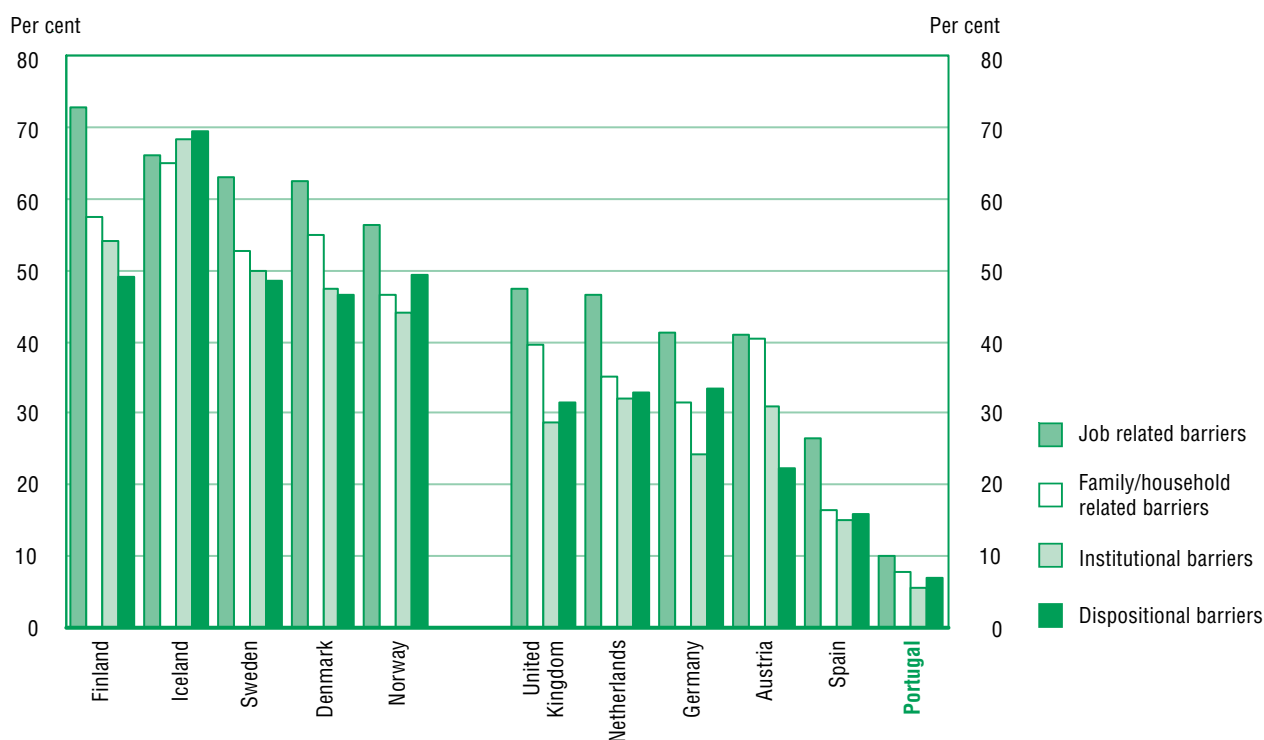
However, as data in Figure 6.5 display, the actual participation rates of adults who report various barriers vary substantially across countries. These estimates provide some indication about the extent to which perceived barriers are successfully overcome. What is striking is that in nearly all cases there is a consistent pattern. Adults from Nordic countries are more likely to participate in adult education classes, even though they may perceive the same barriers as their counterparts in other countries. The widespread, low-cost availability and easy access to courses adapted to the needs of working adults are important factors.

Although there are wide variations within each of the two sets of countries, the Nordic country at the lower end of the range is still higher than the non-Nordic country at the high end of the range. Out of the 22-27 per cent of Nordic adults who reported family related barriers as significant, about 47-65 per cent nevertheless participated in the 12 months preceding the interview. This can be compared to other European adults who reported family barriers to about the same extent, but only about 8-40 per cent actually participated.

FIGURE 6.5

Participation in adult education and training by barriers

Per cent of adults participating in adult education and training during the year preceding the interview, by various barriers, 2003



Ranked by proportion of adults reporting job related barriers.

Source: Eurobarometer survey data, 2003.

Differences in public policy frameworks can form an important part of the explanation in accounting for these observed differences. For example, public investments in early childhood education and care systems in the Nordic countries

are rather extensive (OECD, 2006). This frees up time from family commitments, thereby facilitating participation, especially for women of young children. There are also a wide range of other supportive family policies which foster a good balance between family and work life, e.g., child allowances, support for lone parents, parental leave schemes, and flexible working hours. These culminate into favourable structural conditions that help families overcome family related barriers to participation.

A similar observation can be made for job related barriers. About 56-73 per cent of Nordic adults who reported this type of barrier (17-30%) nevertheless participated, as compared to 10-47 per cent in other European countries. Additionally, IALS and Eurobarometer data show that Nordic countries are comparatively more successful at reaching adults who are low educated, and are either unemployed, out of the labour force, or in low skill jobs (Desjardins *et al.*, 2006). Again, there are various state policies that can help to explain these observations. Especially since the early 1990s, a time when countries faced many challenges such as globalisation, Nordic countries increased support for active labour market measures, e.g., those aiming at improving access to the labour market and jobs, job-related skills and labour market functioning. These were targeted precisely at getting adults, especially the unemployed and those with low education or low skills back into employment by means of adult education. There are many other structurally related policies which facilitate workers' access to training opportunities including leave schemes and co-financing schemes. Industrial relations in Nordic countries are also important in understanding the results. These are built on a strong corporate tradition. Rather than seeking low-skill equilibrium there are joint efforts by the three parties – the State, labour unions and employers – to pursue a high-skill strategy that serves to assist workers in overcoming job-related barriers.

To sum up, active public policy interventions seem to be a key defining parameter for helping citizens to overcome structural and individually based barriers to participation in adult education and training programmes. A case study exploring the reasons for the success of the Nordic countries helps to reveal that, among other conditions, targeted policy measures designed to assist adults in overcoming barriers, particularly job related ones, can be effective at resolving barriers.

It is clear that the Nordic welfare states feature structural conditions under which a larger group of adults, compared to other European countries, seem to value participation and hence see an expected reward. These conditions include a labour market structured around a high skill strategy and a civil society that fosters learning for both social and personal development. In particular, targeted measures such as favourable access to financing and a wide offer of learning opportunities which can respond to the economic, social, and personal aspirations of individuals as well as collectives (e.g., the labour movement, senior citizens, and immigrants), seem to have helped foster the capability among many, although far from all, to overcome barriers.

Policy makers in Portugal realise that structures and conditions must be created to address the consequences of past under investment. A key pillar of the government's strategy to up-skill the labour force is the roll out of the *Novas Oportunidades* (New Opportunity) programme, which is aimed at young people at risk of dropping out of the education system and adults in need of up-skilling. The recognition, validation and certification of acquired competencies and skills will be the new starting point for all adult education and training. Portugal's *Novas Oportunidades* programme is briefly summarised in Box 6.1 (OECD, 2008).

Box 6.1**The Novas Oportunidades programme**

The “New Opportunity” programme’s objective is to raise the basic qualifications of the Portuguese population, by acting along two main lines: tackling poor performance in the education system and providing learning opportunities to adults with low education attainment. The initiative benefits from financial support from the European Social Fund.

The Novas Oportunidades centres are responsible for providing information and organising the qualification of people in two ways, through double certification that will allow (certified) training and through the recognition of acquired competences. The newly-created National Agency for Qualifications allows monitoring the activities of the various centers of Novas Oportunidades.*

For young people, it aims at increasing the supply of courses in double certification on such a scale that half the total number of young people attending secondary education would have the possibility to access various types of courses (vocational, technological, apprenticeship, etc.) Further more it envisages setting up additional courses so that all those at risk of leaving the education system early would be able to complete the 9th grade of schooling through specialised occupational paths. The objective is to have by 2010 over 650 000 young people in courses of double certification at the level of the 12th year of schooling.

For adults, where the actions are directed at people aged 18 and over who have not completed the 9th year of schooling, the objective is to promote their integration in formal learning. The objective is to have 1 million people certified through adult education schemes by 2010. To achieve this, a key step is recognizing qualifications acquired throughout life. Then another important condition will be to have a supply of training and occupational education matching the specific needs of adults in this category. This is a challenge for Portugal where typically the offer of training was not directed at people already in employment.

* In 2007, 268 centres were operating. By 2010 there should be 500 centres or teams operating. Monitoring and control can be achieved through an information system that collects detailed data about adults enrolled and attainment of objectives: guides and quality charts are being produced; the national catalogue of qualifications is under construction.

Source: *OECD Economic Surveys: Portugal*, Volume 2008/9, June 2008, p. 136.

6.5 Fostering Demand: The Role of Social, Cultural and Work-related Practices

Data from IALS suggest that the world of work and, in particular, the nature of work tasks interact strongly with the skill investment behaviours of both individuals and employers. Figure 6.6 indicates that employer financing of training tends to be concentrated in skilled occupations, in particular for workers who already are high skilled (i.e., high skill matches) and have high levels of initial educational attainment. Working in a large firm is also an important determinant of who obtains employer financing for continuing education and training. The highest training activity seems to be concentrated in firms that are large, competing in global markets, and are undergoing significant technological change and/or changing work practices (OECD, 2003:51-53).

The available evidence (see Table 6.3) establishes an empirical regularity, namely that the ones who already have education receive more and the ones who do not have much education find it difficult to receive any at all (the so-called Matthew Effect⁵).

This phenomenon exacerbates inequalities. Disadvantaged groups tend not to participate, which could otherwise improve their life situation. They also often find themselves in contexts (at or outside work) that do not stimulate a readiness to engage in learning. This is the case across all the world's regions, sub-regions and income groups, including low, lower and upper middle, and high income countries. The phenomenon observed from available evidence thus appears to be a universal tendency, albeit a complex one that operates differently in various contexts, pointing to the need for diversified and context sensitive policies and programmes which can address this divisive force that is inherent to all societies. Although it does not operate in isolation, functional literacy is at the root of the so-called Matthew phenomenon.

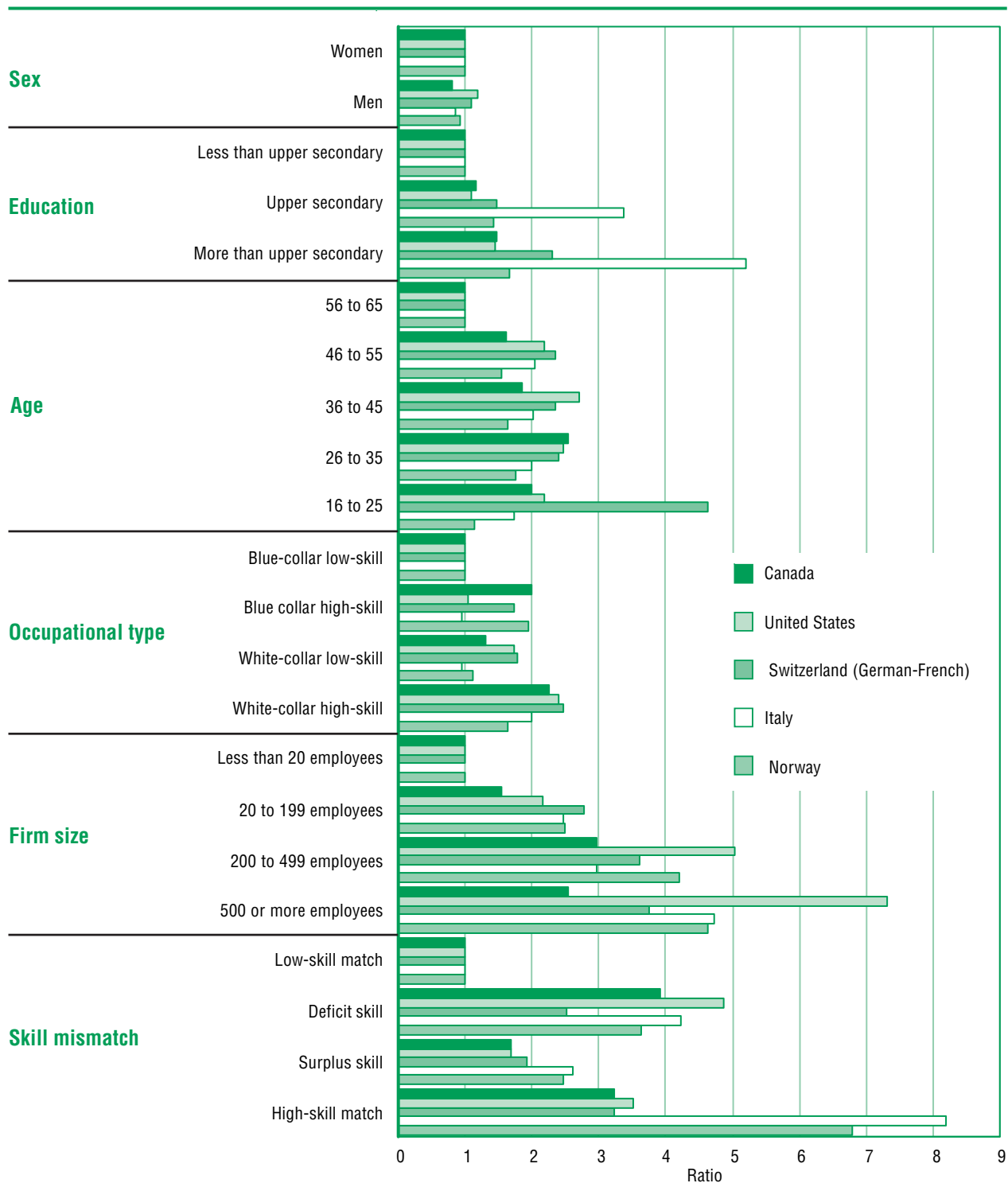
Functional literacy is part of a complex and dynamic cycle of development, which is inherently interdependent with social and cultural practices as well as with one's own opportunity structure and life chances including, not least, access to relevant and appropriate adult learning opportunities throughout the life cycle. While there is a mutual reinforcing effect between initial education, adult learning and functional literacy, it is necessary for individuals to be exposed to a sustained effort which is aimed at facilitating initial levels of functional literacy (i.e. basic schooling) in order for the cycle to have a positive development and reinforcing effect. But basic schooling should only be seen as a way to initiate this development and foster the early stages of functional literacy. Sustained basic adult learning at a later period can be vital for compensating for a lack of initial formal schooling but attention needs to be paid to the broader mechanisms at play in order to foster the development of functional literacy, among which continued adult learning has an equally vital role to play over the entire life span.

5. The "*Matthew effect*" denotes the phenomenon that "the rich get richer and the poor get poorer" and can be observed in various different contexts where "rich" and "poor" can take different meanings.

FIGURE 6.6

Employer support for adult education

Adjusted¹ odds ratios showing the likelihood of adults (excluding full time students aged 16 to 24) receiving employer financed adult education and training during the 12 months preceding the interview, by various determinants, by country, 2003



Source: Adult Literacy and Lifeskills Survey, 2003.

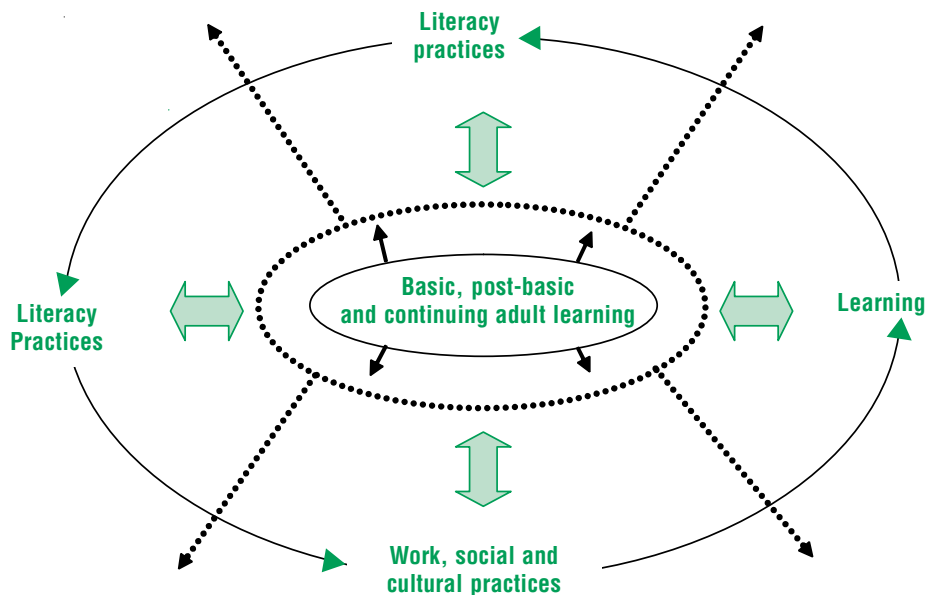
1. Adjusted for age, sex, education, occupational type, and firm size.

Given the opportunity to realise new experiences, especially those that are systematically designed to foster learning, individuals are subject to an upward spiralling effect on functional literacy as well as on wider personal development, which can affect not only their own everyday work, social and cultural practices but also the practices of others around them. Figure 6.7 illustrates this phenomenon.

At higher levels of aggregation, the expansion of systematic and purposeful educational opportunities is subject to an upward spiralling effect on social and economic development. But the ‘rules of access’ to educational opportunities and the accompanying structure of opportunities on the labour market as well as in the community, which every individual or group are confronted with, will inevitably stratify the outcomes associated with development. This is part of the inherent mechanism which is embedded in social systems. In order to counter sharp inequalities in outcomes, which have been shown to not only be detrimental to the social and cultural fabric of human existence but also to wider social cohesion and economic prosperity, active and ongoing public policies which are committed to equity, justice and fairness are necessary.

FIGURE 6.7

The upward spiralling effect of educational activity



Source: Adapted from Gray (1956, p. 24).

One key point to note is that not receiving adequate opportunities or not reaching the threshold necessary for an upward trajectory to occur, people, groups, or even communities can remain in a narrowly defined set of life experiences with few opportunities to develop functional literacy skills, especially of the kind that bridges the experiences of those not immediately around them. For many, this may mean being trapped in a downward cycle of poverty and isolation. Missing out on education, either initially or throughout adult life, thus increases the vulnerability

of people to social exclusion. This is so because change in modern societies tends to be technically biased and depends greatly on the development of functional literacy. Those who have the requisite basic levels of functional literacy can participate in and contribute to development while those who do not are excluded. This increases the importance of continuous learning and adaptation by all.

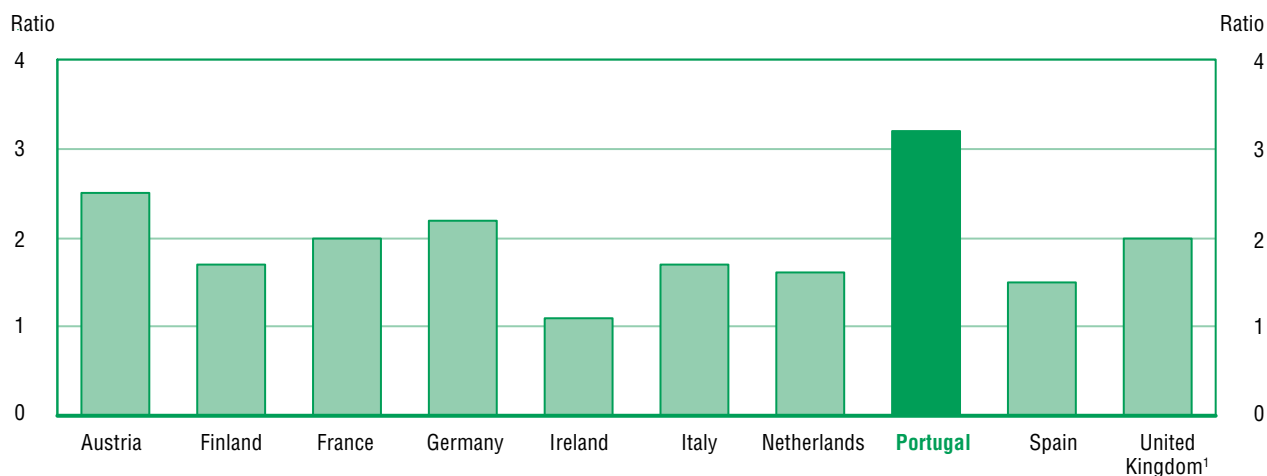
Even with access to educational opportunities, however, education systems can serve to reinforce social inequalities (Bourdieu and Passeron, 1970). While more education for everyone can lead to general across the board increases in social and material standards of living, the available evidence shows that education systems reproduce social inequalities in educational outcomes, not reverse them (e.g. see follow up to the EFA led by UNESCO-OREALC (2007) as well as results from PISA).

Figure 6.8 shows that social reproduction through the education system is marked in Portugal because many more university students are recruited from families in which the father has obtained tertiary education than is warranted by the proportion of such families in the general population. The data show that social selectivity in tertiary education is the highest in Portugal, with a ratio of 3.2 – twice the level observed in Spain and nearly three times that of Ireland.

FIGURE 6.8

Educational status of university students' fathers, 2004

Ratio of the proportion of students' fathers with tertiary education to the proportion of men of the corresponding age group as students' fathers with tertiary education



1. England and Wales: data refer to the parent (male or female) with the highest income.

Source: OECD, *Education at a Glance, 2008* (p.139).

This means that not only should the structural barriers that limit access to education and adult learning be addressed by public policy, but the wider processes that lead to the distribution of educational outcomes (e.g. capabilities), from children to adults, must also be carefully considered if equity is to be addressed in a serious manner.

Extending opportunities, ensuring access and minimising barriers is thus essential. There are various barriers to adult learning ranging from situational ones to institutional and dispositional ones (Cross, 1981). The previous section provided examples of how public policies can be aimed to help adults overcome these barriers and thus how adults can be aided in pursuing an upward trajectory in the development of functional literacy. Naturally, the degree of ‘upwardness’ in a particular trajectory varies according to individual life experiences and is contingent not least on the contextual conditions faced by individuals. One of the most dominant factors shaping educational and/or occupational trajectories and life chances in modern societies is the level of qualification.⁶ But access to a nurturing job can be second to none in shaping an upward trajectory in the development of functional literacy.

Formal qualifications and nurturing jobs, however, tend to go hand in hand, which is one reason for the observed ‘Matthew effect’. People who are in jobs that demand exposure to a wide variety of print materials as well as contexts, for example by meeting a wide variety of people and seeing different places, are continually nurturing their functional literacy and other capabilities for functioning in a complex world. By extension, the extent to which literacy practices are embedded in everyday work practices is therefore of crucial importance for nurturing functional literacy as well as shaping one’s opportunity structure and life chances (Desjardins, 2004; Reder, 2009).

Beyond the labour market, the extent to which literacy practices are embedded in social and cultural practices are also fundamental for continued learning and personal development. Diverse and nurturing learning experiences make people aware of others around them and the complex processes involved in society (Pring, 1999), creating an interest to take part in the processes of social change. Having capabilities such as functional literacy motivates people by instilling a sense of agency – capabilities make people feel like they have something to offer. Adult learning for personal and community development can therefore also be an important perpetuator of the upward development effect associated with adult learning.

6.6 The Role of Social Capital in the Production of Human Capital

The discussion above has pointed to the importance of focusing on how the demand structure governs adults’ readiness to engage in learning. The IALS background questionnaire included a few questions that address informal learning in the form of reading and writing activities at work and in daily life. To regularly engage in reading activities is important not only to learn new skills but also to maintain learning ability. However, the IALS data show that in Portugal only one in four adults reported reading a book at least once a month. In all other countries the proportions of the population reading a book regularly were much higher. Accordingly, Portuguese National Reading Plan correctly emphasises the interaction between promoting reading books at home, in schools and in public libraries.

Social capital theorists argue that participation in non-work contexts is an important determining factor of the quality of democratic life and civic society (Coleman, 1988; Ostrom, 1994). Putnam (1993) sees social capital reflected in

6. Even further, actual beneficiaries of validation mechanisms designed to recognise competencies gained through life experience or through non-formal education are those who already have the highest levels of qualification (Werquin, 2007).

participation in voluntary associations, norms of reciprocity and trust, and networks of civic engagement. According to its proponents, social capital enables people to achieve goals they would not have been able to reach in its absence. Verba *et al.* (1995) argue that certain resources, including civic skills, are necessary for political participation. They also point to the acquisition of civic skills that takes place in voluntary associations. Just as literacy skills are a prerequisite to learn efficiently on the job, participation in civic society is necessary for developing civic skills. Voluntary associations and community activities are therefore important arenas for informal learning that can stimulate the development of new skills as well as preventing others from being lost due to lack of use.

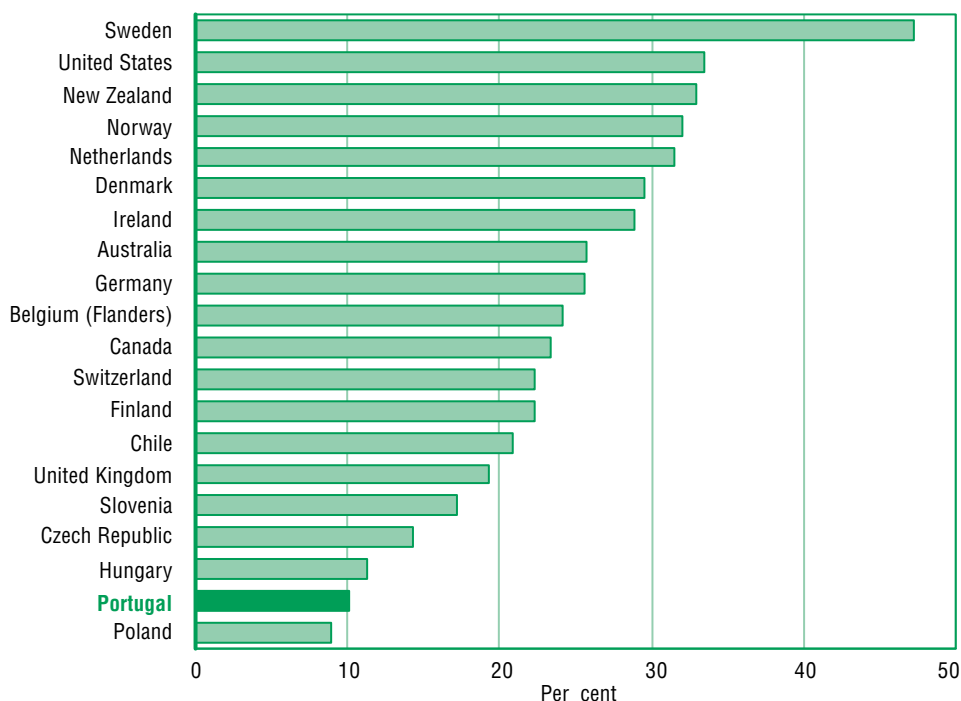
The IALS touches upon the issue of civic skills and social capital in a question about the extent to which the respondents participate in voluntary community activities. Figure 6.9 shows the crucial role the voluntary sector plays in Swedish society, where close to 50 per cent of the adult population participate at least once a month in voluntary associations. These associations provide a rich environment for informal learning that fosters democratic values and helps keep individuals mentally active.

Citizens of Portugal do not seem to have access to an equivalent collectively constituted arena for informal learning. In this country only 10 per cent reported that they are active on a regular basis in voluntary associations. For this reason the National Reading Plan needs to interact with voluntary and community based organisations.

FIGURE 6.9

Voluntary participation in community activities

Per cent of the population aged 16 to 65 who reported engaging in community activities at least once a month, 1994-1998



Countries are ranked by the proportion of respondents engaging in community activities at least once a month.

Source: International Adult Literacy Survey, 1994-1998.

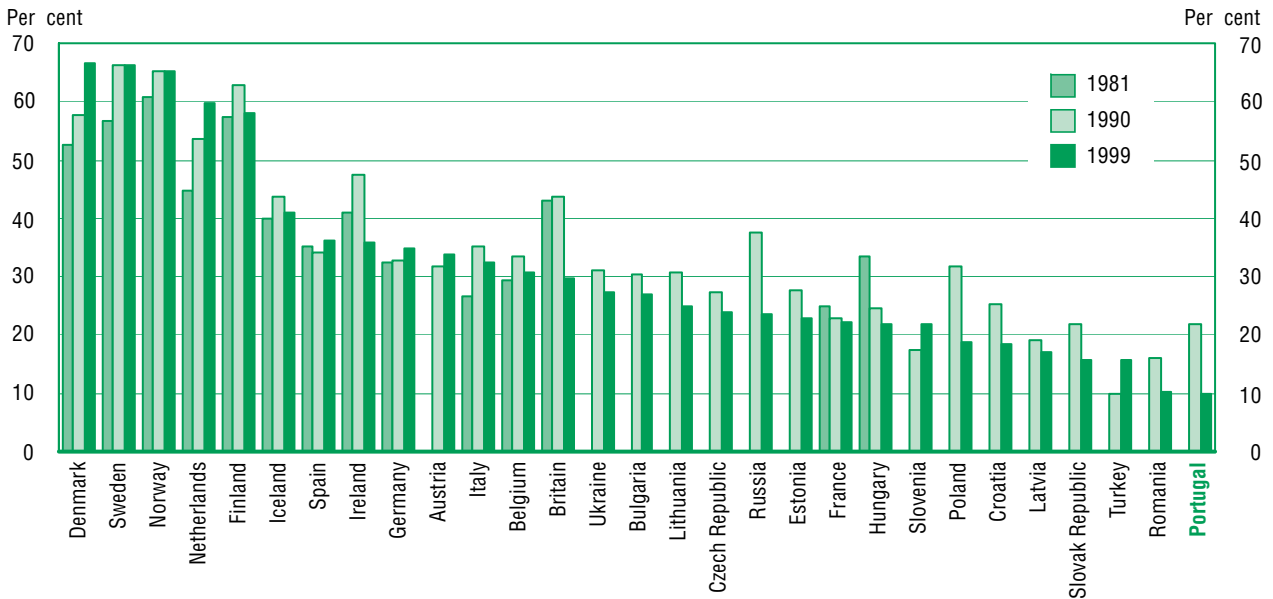
In order to assist those with low literacy skills, a strategy will have to be devised that reaches out to workplaces and also builds on the community and voluntary sector in delivering adult education and strengthening a culture of literacy, civic society and shared values. This sector is flexible and reaches out to adults who otherwise might not engage in adult learning. Promoting civic society and shared values is an important task facing countries striving for social cohesion. For this to happen effectively, however, there needs to be a strong basis of trust in society. Unfortunately, however, there appears to be little shared trust in Portuguese society.

In 1999 the World and European Values Survey asked the question, “Do you in general trust other people?” (to be answered “yes” or “you can’t be careful enough”). The results show that generalised trust is high in the Nordic countries and the Netherlands, even rising, while in several Southern and Central Eastern European countries it is lower and falling (OECD, 2008, p.73). Low levels of organisation membership and low participation in voluntary and community activities go hand in hand with low levels of trust in others and generally in social organisations such as schools. This relationship is not perfect, however. Portugal and Spain have both low scores on voluntary organisation membership, but while trust is lower in Portugal – and apparently on a downward trend – than in any other country shown in Figure 9.10, Spain ranks close to the high trust Nordic countries. According to the OECD (2008), these data suggest that the quality of social relations also needs to be given attention as part of the Portuguese national strategy for the development of skills for the knowledge economy.

FIGURE 6.10

Trusting others – wide variation, no clear trend

Percentage of World and European Values Survey respondents saying that “in general they trust people”, 1981, 1990 and 1999



Source: OECD, *Trends Shaping Education*, 2008 Edition.

The next chapter draws together the various strands woven through the report, presents the conclusions and briefly discusses possible implications for Portuguese policy action.

Conclusions

Literacy – the ability to understand and apply knowledge presented in print – has long been recognised as a key determinant of economic growth. This fact is reflected in the level of public and private resources that are invested in imparting reading, writing and numeracy skills to successive cohorts of children. Policy makers have long assumed that these investments in basic schooling were sufficient to provide all the foundation skills needed on the Portuguese labour market. As a result, arguments in favour of public investment in adult basic education have been couched as a moral imperative, rather than an economic one. The goal of this report has been to provide readers with the theory and the empirical evidence supporting the economic argument for investment in adult literacy.

7.1 Main Strands of the Story Line

This report has presented the economic theory and associated empirical evidence demonstrating beyond doubt that literacy is a critically important determinant of economic development and social progress across a broad spectrum of countries. Differences in average adult literacy levels underlie 55 per cent of the large differences in GDP per capita that have emerged during the post-war period among the OECD countries. Ironically, higher proportions of adults with low literacy skills compound the impact that literacy has on long term rates of GDP and labour productivity growth.

Literacy also influences the social distribution of a range of important outcomes at the individual level. Adults with low literacy skills experience more often spells of unemployment, earn lower wages, have much higher chances of being poor, are in poorer health, are less socially engaged, and have less frequent access to educational opportunities than their more literate peers.

Changes that are transforming the structure of the global economy are likely to further increase the importance of functional literacy to economic performance. Thus literacy will have a marked impact on the capacity of the OECD economies to maintain their competitiveness, and standards of living, in what is rapidly becoming a fiercely more competitive world.

7.2 General Policy Implications

The key point for policy makers throughout the OECD area is that steps will have to be taken to simultaneously improve the quantity and quality of literacy skill supply as well as increase the economic and social demand for literacy skill. The efficiency of the markets that mediate literacy supply and demand also needs to be improved. This general point for the advanced economies of the OECD has become an absolute economic imperative for Portugal.

Portugal has been among the slowest in Europe to increase the quantity and quality of pre-school, basic education, upper secondary and tertiary education. As a result, average adult literacy levels are among the lowest in the OECD area and Portugal has among the highest proportions of low-skilled adults of any European country. Engaging 100 per cent of all four and five year olds in the country in literacy rich activities in pre-schools, greatly enhancing the quality of basic education achieved, as measured by the average literacy scores of students passing each level and by the proportions of students leaving the cycle of basic education with low functional literacy skills, must take priority. Portugal's National Reading Plan, reviewed below, will contribute towards achieving these goals.

Yet relying solely on measures directed at children and youth will not precipitate rapid enough improvement in workforce skills. Portuguese fertility rates are among the lowest in Europe – a fact that limits their impact on skills in the aggregate. Expanding participation in remedial adult literacy classes and in general and vocational secondary programmes specifically designed for adults with little schooling is urgently needed to help overcome past under-investment. Policy makers in Portugal realise this. A key pillar of the government's strategy to up-skill the labour force is the roll out of the *Novas Oportunidades* (New Opportunities) programme, which is aimed at young people at risk of dropping out of the education system and adults in need of up-skilling. The recognition, validation and certification of acquired competencies and skills will be the new starting point for all adult education and training.

The analysis suggests that policy changes are also urgently needed in two other areas. First, steps must be taken to increase the level of literacy skill demand in Portugal. The skill intensity of employment in the Portuguese economy is among the lowest in Europe and, although the situation is improving, it is not doing so as rapidly as elsewhere. Achieving the rapid diffusion of ICT throughout the production chains of firms – needed to match the productivity increases of key competitors – will depend on increased functional literacy levels. Second, measures need to be taken to improve the efficiency of the Portuguese markets for literacy. The analysis of data presented in the final section of Chapter 5 indicates that the Portuguese labour market rewards literacy skill only at the highest levels, an indication of inefficiency that reduces incentives for students and workers to acquire and apply their literacy skills.

The inescapable conclusion is that Portugal needs to pay much more attention to literacy. The analyses of the impact of literacy on Portugal's economic performance over the past 50 years leaves little doubt that the nation has paid a significant price for failing to increase the supply of literacy skill available to the economy. The estimate of GDP per capita forgone represents a huge reduction in the standard of living available to the vast majority of Portuguese citizens.

Correcting this situation will require a concerted and co-ordinated effort, one that links educational, social and economic policies in a way that increases the supply of literacy skill leaving the school system; reduces the number of low skilled adults through the provision of remedial instruction; increases the knowledge and skill intensity of employment and the demand for literacy use at work; improves the efficiency of the markets that allocate literacy skill; and increases the social and economic demand for literacy skill acquisition and use.

A failure to undertake such concerted and co-ordinated action will inevitably lead to below-potential rates of economic growth and standards of living. In such a case, Portuguese industries will find it increasingly difficult to compete with their European and other foreign competitors. Unemployment will rise, wages and benefits

will fall, and social inequality in matters the Portuguese value the most – health, wealth and sense of belonging – will rise. The economic stakes for Portugal are high. In 2000 the Portuguese GDP per capita stood at US\$ 16,034, a level fully US\$ 8,320 less than the average of 15 of their peers in the OECD area. Money may not be able to buy happiness but this amount of forgone income would precipitate a huge improvement in the standard of living enjoyed by the majority of Portugal’s citizens. Literacy is the key to unlocking these benefits.

7.3 Implications for the National Reading Plan

The evidence presented in Chapter 5 leaves little doubt that a programme such as the National Reading Plan is desperately needed in Portugal. Recent cohorts of youth leaving the Portuguese basic education system have among the lowest average levels of literacy skill, and among the highest percentages in the lowest skill levels, of all European countries. In the absence of massive intervention, the quantity and quality of the skill flowing out of the Portuguese basic education system will have little impact on the overall supply of skill available to the tertiary education system and the labour market.

Without improvement in literacy scores the returns on investment in tertiary education will be lower than expected and rates of productivity growth will be constrained. As a result Portugal’s ability to compete in European and global markets will be hampered. Accordingly, this report offers strong endorsement for the National Reading Plan and the goals of improving reading literacy behaviours in pre-schools and among children and youth in basic schooling and, in the long term, increasing the social demand for reading.

Notwithstanding this general endorsement the findings suggest a need to enhance several aspects of the current plan.

First, the initiatives are focused mainly on increasing the social demand for literacy skill and increasing opportunities for students to engage in literacy practice. While necessary steps, these may not be sufficient to precipitate the desired across-the-board improvements in literacy skill. Portugal has already launched a national programme to upgrade the pedagogical competencies of language teachers in primary schools. This programme could be further strengthened if teachers’ diagnostic skills and instructional practice for literacy can be improved. It is also likely that primary teachers need access to a broader range of tools for the assessment and diagnosis of early reading difficulties and associated intervention strategies to deal with identified deficiencies. Without measures such as these, increased demand for reading may not translate into increased supply. The available evidence from PIRLS and PISA provides strong indications that many Portuguese primary teachers do not have the requisite competence in teaching children to read with increasing levels of skill. For the success of the educational reforms already initiated, teachers have to be actively involved in and supportive of the reform processes to which the country is committed.

Second, the goals set for the number of hours that will be devoted to reading in the pre-school and early grades is below what the research literature suggests is needed to reduce inequalities in readiness to learn among groups of children from different social groups and to ensure that all children are prepared to successfully make the transition from “learning to read” to “reading to learn” by the 4th Grade. Expanding opportunities to learn throughout the day and increasing time spent on reading tasks are therefore important considerations.

Third, and perhaps most importantly, there is a lack of complimentary investment designed to increase the level of economic demand for literacy and, by extension, the intensity of literacy engagement in the workplace. As noted in Chapter 4 the knowledge and skill intensity of Portuguese employment is low in comparative perspective. Additionally, the Portuguese labour market does not appear to reward literacy skill to the extent expected. Faced with this reality, all but the very best Portuguese students have little incentive to invest time and effort in increasing their level of literacy.

Fourth, it is not clear that increasing the social demand for literacy skill and student engagement in literacy practice will necessarily have the desired impact on school-aged children who have left the initial education system. Portugal has among the lowest rates of persistence to upper secondary completion in Europe, a fact that limits the efficacy of school-based interventions for these students. International comparative data suggest that upper secondary graduation is a critical marker, one that maximises the probability of students reaching Level 3 on the international proficiency scales. Level 3 has been judged to be the level needed to support tertiary participation, life long learning, labour productivity and democratic engagement. Thus, the ambitious reforms already launched aimed at further reducing drop out rates will afford educators more opportunity to influence children's reading levels.

Finally, a failure to invest more resources in the provision of efficient and effective adult literacy instruction, particularly at the workplace but also through the New Opportunities programmes, can be expected to reduce the overall effectiveness of the National Reading Plan. Children living in households characterised by low levels of parental schooling and little reading practice, where access to a broad range of literacy materials is restricted, will be less responsive to the incentives created in the Plan. More focus on family literacy programmes has the potential to simultaneously improve the literacy skill levels of both generations.

To conclude, we believe that the ambitious educational reform initiatives being implemented in Portugal are sorely needed. In particular the National Reading Plan should, over time, increase both the social demand for reading and the intensity of literacy skill use in the labour market. In the absence of such a Plan, Portugal will have great difficulty maintaining its competitiveness in European and global markets and will have increasing difficulty in attracting foreign direct investment. If our analysis is correct, unless Portugal achieves a rapid and substantive increase in the functional literacy level of its entire population then the country will have difficulty achieving its economic and social objectives, and only massive transfers from the European Union will prevent it from experiencing a relative decline in its standard of living.

Data Tables

TABLE 3.2A

Mean index scores on a scale measuring the intensity of use of computers for specific task-oriented purposes, by prose literacy levels, populations aged 16 to 65, 2003

	Prose literacy scale							
	Level 1		Level 2		Level 3		Level 4/5	
Bermuda	3.9	(0.1)	4.9	(0.1)	5.6	(0.1)	6.1	(0.1)
Canada	3.8	(0.1)	4.8	(0.0)	5.4	(0.0)	5.8	(0.1)
Italy	3.5	(0.0)	4.3	(0.1)	4.9	(0.1)	5.3	(0.2)
Norway	4.0	(0.2)	4.6	(0.1)	5.3	(0.0)	5.7	(0.0)
Switzerland	4.4	(0.1)	5.1	(0.1)	5.6	(0.0)	6.0	(0.1)
United States	3.9	(0.1)	4.9	(0.1)	5.6	(0.1)	6.0	(0.1)

Note: Data for Figures 3.2A.

Source: Adult Literacy and Life Skills Survey, 2003.

TABLE 3.2B

Adjusted odds ratio showing the likelihood of adults aged 16 to 65 of being high-intensity computer users, by prose literacy levels, 2003

	Levels 1 and 2		Level 3		Level 4/5	
Bermuda	1.00		2.38***	(0.26)	3.39***	(0.25)
Canada	1.00		1.83***	(0.12)	2.40***	(0.14)
Italy	1.00		1.64**	(0.19)	2.02**	(0.34)
Norway	1.00		1.80***	(0.19)	2.66***	(0.15)
Switzerland	1.00		1.78***	(0.19)	1.91**	(0.25)
United States	1.00		1.59***	(0.14)	1.94***	(0.15)

* p<0.10, statistically significant at the 10 per cent level.

** p<0.05, statistically significant at the 5 per cent level.

*** p<0.01, statistically significant at the 1 per cent level.

Notes: Standard errors are of the logarithm of the odds ratios.

Odds are adjusted for gender, age, educational attainment, labour force status and total household income.

Data for Figures 3.2B.

Source: Adult Literacy and Life Skills Survey, 2003.

TABLE 3.2C

Adjusted odds ratio showing the likelihood of adults aged 16 to 65 of being a top income quartile earner, by combined literacy and computer user profiles¹, 2003

	Group 1	Group 2	Group 3	Group 4
Bermuda	1.00	2.38 *** (0.25)	2.06 (0.42)	5.68 *** (0.24)
Canada	1.00	2.63 *** (0.08)	2.52 *** (0.20)	5.18 *** (0.10)
Italy	1.00	1.27 (0.22)	1.69 *** (0.18)	1.80 ** (0.26)
Norway	1.00	1.79 *** (0.15)	1.95 ** (0.29)	3.85 *** (0.22)
Switzerland	1.00	2.25 *** (0.16)	3.27 *** (0.27)	6.30 *** (0.27)
United States	1.00	1.86 *** (0.17)	2.07 *** (0.22)	3.75 *** (0.17)

1. See Box 8B.

* p<0.10, statistically significant at the 10 per cent level.

** p<0.05, statistically significant at the 5 per cent level.

*** p<0.01, statistically significant at the 1 per cent level.

Notes: Standard errors are of the logarithm of the odds ratios.

Odds are adjusted for gender, age, educational attainment and labour force status.

Data for Figures 3.2C.

Source: Adult Literacy and Life Skills Survey, 2003.

TABLE 3.5

Likelihood of being in fair/poor health; receiving income support; being not engaged in community activities by health literacy levels, population aged 16 and over, Canada, 2003

	Level 0/1	Level 2	Level 3	Level 4/5
Having fair or poor health	2.56	1.59	1.23	1
Being on income support	2.56	1.72	1.25	1
Being not engaged in community services	2.53	1.63	1.22	1

Note: Data for Figure 3.5.

TABLE 4.1

**Log of real GDP per capita adjusted for terms-of-trade changes,
Portugal and selected OECD countries, 1950-2000**

Year	Log of real GDP per capita Portugal	Log of real GDP per capita 15-country average
1950	3.3334513650	3.8413704030
1955	3.4446721950	3.9083258220
1960	3.5202768780	3.9602424480
1965	3.6365689120	4.0421063820
1970	3.7883665520	4.1095681450
1975	3.8561104710	4.1536322440
1980	3.9214844110	4.1996910330
1985	3.9414250510	4.2385455270
1990	4.0754099440	4.2962356220
1995	4.1184129930	4.307917820
2000	4.2050406250	4.3865693910

Source: Data for Figure 4.1.

TABLE 4.2

**Average literacy scores (average score of prose, quantitative and document scales),
Portugal and selected OECD countries, 1960-1995**

Portugal and 15-country mean						
	Both sexes- Portugal	Both sexes- average	Women- Portugal	Women- average	Men- Portugal	Men- average
1960	202.9	257.6	184.0	251.4	227.9	264.5
1965	213.9	267.7	191.4	262.2	240.6	273.7
1970	209.8	273.5	188.3	269.1	237.5	278.3
1975	212.8	277.2	195.0	274.0	234.8	280.6
1980	215.3	281.1	204.2	279.6	228.9	282.7
1985	232.5	284.3	225.2	282.5	239.4	285.9
1990	258.5	287.8	259.7	286.8	257.6	288.6
1995	258.3	286.4	263.4	286.4	253.7	286.5

Source: Data for Figure 4.2.

TABLE 5.9

Years of schooling by wage earnings (in quintiles), workforce aged 16 to 65 years, selected OECD countries, 1994-1998

	Canada	Switzerland	Italy	Norway	United States	Portugal	Total
Lowest quintile	11.15	11.68	10.95	11.73	12.44	7.04	12.04
Second lowest quintile	11.87	11.89	9.62	11.39	12.91	7.14	12.4
Middle quintile	13.01	11.9	10.84	11.43	14.15	5.97	13.37
Second highest quintile	13.72	12.62	11.92	12.2	15.18	6.39	14.15
Highest quintile	14.6	14.23	13.45	13.08	17.33	8.92	14.94

Note: Data for Figure 5.9

TABLE 5.10

Mean scores on the prose literacy scale ranging from 0 to 500 points, by wage earnings (in quintiles), workforce aged 16 to 65 years, selected OECD countries, 1994-1998

	Canada	Switzerland	Italy	Norway	United States	Portugal	Total
Lowest quintile	260.9155	269.2609	247.8408	292.0641	259.0848	219.4379	257.1615
Second lowest quintile	268.1617	259.4181	233.9019	289.2775	275.7033	223.8771	270.3927
Middle quintile	288.3691	265.9626	248.3202	286.0317	297.0348	189.177	286.9949
Second highest quintile	295.7434	269.0873	263.1535	295.5303	313.6696	212.6803	300.0617
Highest quintile	308.6577	290.9276	266.6764	296.9989	326.7366	249.9986	301.6616

Note: Data for Figure 5.10

TABLE 5.11

Unemployment rate by literacy skill levels on the prose scale, workforce aged 16 to 65 years, selected OECD countries, 1994-1998

	Canada	Switzerland (German and French)	Italy	Norway	United States	Portugal
Unemployment rate in per cent						
Level 1	25.60	5.70	13.30	14.60	10.00	16.20
Level 2	10.10	3.90	11.10	3.20	5.10	14.20
Level 3	10.40	3.20	9.50	3.20	4.80	8.70
Level 4/5	3.80	4.40	8.70	2.30	2.00	10.00

Note: Data for Figure 5.11

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