

Responding to the Economic Crisis

Fostering Industrial Restructuring and Renewal



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Industry and Innovation

RESPONDING TO THE ECONOMIC CRISIS:

Fostering Industrial Restructuring and Renewal



ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

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Foreword

Across most OECD countries the direct result of the global economic crisis has been a fall in GDP, trade, and employment. Nowhere has this impact been more felt than in the automotive and construction industries, where the economic crisis has aggravated difficulties that predated the crisis.

In the automobile industry, demand has fallen rapidly as consumers and firms have postponed costly purchases. Many firms are struggling to remain competitive in an environment where competition, legislation and customer demand for more efficient cars and more value for money were already putting pressure on existing business models prior to the crisis. The construction sector is also faced with a considerable slump in consumer and investment demand, and has long struggled with low labour productivity growth, partly linked to the nature of innovation in an industry where many projects are unique. In both industries, concerns over overcapacity have increased since the crisis.

However, the crisis also provides an opportunity for both governments and the private sector to transform these industries. In the automobile industry, the crisis may help accelerate the development of strategic alliances, which could contribute to more joint R&D and production platforms and a more effective division of labour. It may also provide an opportunity for new or emerging players to enter the market and for a greater focus on meeting demand for cleaner cars. In the construction industry, the growing demand for 'greener' buildings and a more sustainable built environment may also foster innovation in the industry.

The role of the government in seizing this opportunity is crucial. Recent stimulus packages offer an immediate opportunity and many countries have taken measures that not only stimulate short-term demand, but also foster long-term growth. Strengthening the long-run potential of OECD economies and fostering industrial renewal also requires a long-term strategy, however, based on sound fundamentals. It requires attention to tools that facilitate and enable renewal such as seed capital funds, policies fostering entrepreneurship and start-ups, skills upgrading and training, and investments in capabilities for innovation. It also requires that governments do not give in to policies that may postpone the required restructuring in these industries, or take protectionist measures.

This paper contributes to the OECD's Strategic Response to the Economic Crisis and analyses the impact of the global economic downturn on the long-term competitiveness of the automotive and construction sectors and explores the role of government policy in generating restructuring and renewal.

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Executive Summary

Nearly all OECD countries have suffered a fall in GDP and, trade flows and increased unemployment rates due to the global economic crisis. In the OECD area the unemployment rate rose to 8.3% in May 2009. This is 2.4 percentage points higher than a year earlier. GDP fell by 2.1% in the first quarter of 2009, the largest fall since OECD records began in 1960. Export volumes of the G7 countries fell by 13.6% in the first quarter of 2009 and the current expectation for 2009 is that world trade volumes will fall by 16% from 2008 levels.

The sharp declines in trade, foreign direct investment and access to international financing pose a risk to the global supply chains that underpin innovation. These supply chains are critical sources of new knowledge and learning for firms. They provide companies with technical expertise, knowledge of foreign markets, critical business contacts and international partners. Moreover, an economic crisis caused by a severe drop in demand can have negative implications for long-term economic growth, e.g. by: *i)* restricting the entry of innovative start-ups; *ii)* precipitating the decline of young innovative firms that require financing or active exit markets (*e.g.* IPOs, mergers or acquisitions), *iii)* forcing established firms to shelve or postpone new projects; and *iv)* slow down knowledge transfer, diffusion and adoption along local and international value chains. Such impacts affect the ability of the economy to reallocate resources from declining industries to newly emerging industries and new opportunities.

The impacts of the crisis are particularly visible in certain industries, such as the automobile industry and the construction sector. In the automobile industry, demand has fallen rapidly as consumers and firms have postponed costly purchases. Many firms are struggling to remain competitive in an environment where competition, legislation and customer demand for more efficient cars and more value for money were already putting pressure on existing business models prior to the crisis. The construction sector is also faced with a considerable slump in consumer and investment demand, and has long struggled with low labour productivity growth, partly linked to the nature of innovation in an industry where many projects are unique. In both industries, concerns over overcapacity have increased since the crisis.

However, the crisis also provides an opportunity for both governments and the private sector to transform these sectors. In the automobile industry, for example, the crisis may help accelerate the development of strategic alliances, leading to more integrated supply chains, a more effective division of labour, and more joint R&D and production platforms. It may also provide an opportunity for suppliers in existing automobile supply chains to diversify their business portfolio, for new or emerging players to enter the market and for a greater focus on meeting consumer demand for cleaner cars. In the construction industry, the growing demand for 'greener' buildings and a more sustainable built environment might also foster innovation in the industry.

Government stimulus packages to address the crisis may help foster such opportunities. They are being rolled out by many OECD countries in the hope of stimulating demand and fostering medium-and long-term growth. Within many of these packages, priority is being given to investments in research and development, infrastructure, education, the greening of the economy, support to innovation and SMEs. Such measures may support industrial restructuring and renewal in industries most affected by the crisis.

In the car industry, support is being provided for investments in green technology and fuels to reduce energy consumption and carbon dioxide emissions. Many governments have also taken measures to stimulate demand for new and cleaner cars by providing credit facilities to stimulate car purchases and bonuses to replace old cars with new ones. In addition, some firms in difficulty have received loans or other support by governments.

For the construction sector, government measures aimed at strengthening the infrastructure, *e.g.* through investments in road, rail and buildings, provide an important stimulus. In addition, many schemes aim to boost investment in eco-friendly infrastructure and the building environment. Fiscal incentives are being provided for the purchase or renovation of energy efficient houses and financial help is available for lower wage households or first time buyers to buy houses. Other measures include reductions in VAT for new social housing and the construction of public buildings.

Support for industries in difficulty, such as the car and construction sectors, has to be undertaken with great care. Introducing or increasing government support measures to producers in difficulty will do little to encourage the industry restructuring and renewal that is needed to move towards more viable and sustainable business models. It will also not help address existing overcapacity in the industry. Even if support boosts short-term demand, it can backfire by postponing needed restructuring and wasting taxpayer funds. Furthermore, support measures can be protectionist, and may provoke retaliation from other countries and a global reduction in growth potential. Such measures therefore need to remain selective, and avoid bailing out firms which are not competitive.

Support for producers in difficulty may also distort the marketplace and can multiply across sectors and borders as “equal treatment” is sought. If support is provided, its economic cost should be minimised by making it conditional on progress in industrial restructuring and attaching clear targets and strict limits in terms of size and duration. It is important to ensure that measures are consistent with long-term goals, notably higher productivity and the ability to respond to environmental challenges.

As noted above, the crisis also offers an opportunity for policy makers to explore ways of enhancing the long-term growth potential of their economies and fostering industrial restructuring and renewal. The stimulus packages offer an immediate opportunity and many countries have taken measures that not only stimulate short-term demand, but also foster long-term growth.

Strengthening the long-run potential of OECD economies and fostering industrial renewal also requires a long-term strategy, based on sound fundamentals. It requires attention to instruments and tools that facilitate and enable renewal such as seed capital funds, policies fostering entrepreneurship and start-ups, skills upgrading and training, and investments in capabilities for innovation. It may also require concerted efforts to reduce existing overcapacity in certain industries.

Responding to the economic crisis – fostering industrial restructuring and renewal

Introduction

The financial crisis, now turned into a fully fledged economic crisis (see Box 1), has prompted an immediate response by governments to avoid a world-wide collapse of the financial and banking systems, to limit the economic effects of the credit crunch, and to gradually restore confidence in financial institutions. Policy measures are now being devised to limit the depth and length of the economic recession. Most of these policies are rightly focussing on ensuring that output will not fall too much (or for too long) below its potential and on mitigating the consequences of the downturn. At the same time, policy makers are using the opportunity to address some of the structural problems that underpin and precede the crisis to strengthen the long-term growth potential of OECD economies.

Box 1. Key macro-economic impacts of the economic crisis

The most fundamental and quantifiable effects of the current crisis are the reduction of GDP, trade flows and an increase in unemployment.

Gross domestic product (GDP)

According to preliminary estimates, GDP in the OECD area fell by 2.1% in the first quarter of 2009, the largest fall since OECD records began in 1960. United States GDP fell by 1.6% in the first quarter of 2009, the same rate as in the previous quarter. Japan's GDP declined by 4.0% in the first quarter of 2009, following a 3.8% decrease in the previous quarter. GDP in the euro area was down 2.5%, following a 1.6% fall in the previous quarter.

Trade flows

Merchandise trade volumes of the Group of Seven (G7) took an unprecedented drop in the first quarter of 2009 compared with the previous quarter; G7 exports fell 13.6% while imports were down 10.5%. Although provisional monthly data since February 2009 measured in value terms suggest a slowing down of the rate of decline, world trade volumes are expected to decline by 16% in 2009 compared with 2008 volumes.

Unemployment

The unemployment rate for the OECD area was 8.3% in May 2009, 0.3 percentage point higher than the previous month and 2.4 percentage points higher than a year earlier. In the Euro area, the unemployment rate was 9.5 in May 2009, 0.2 percentage point higher than the previous month and 2.1 percentage points higher than in May 2008. For the United States, the unemployment rate for May 2009 was 9.5%, 0.1 percentage point higher than the previous month and 3.9 percentage points higher than a year earlier. For Japan, the rate was 5.2% in May 2009, 0.2 percentage point higher than the previous month and 1.2 percentage point higher than in May 2008. The unemployment rate in the OECD area is expected to rise to 9.8% in 2010, 1.5 percentage points above the current level.

Source: www.oecd.org/crisisresponse and OECD Economic Outlook 85, June 2009.

This paper contributes to a range of activities in the Directorate for Science, Technology and Industry to address the crisis, mostly focusing on long-term measures. It explores the impact of the economic crisis on a number of industries, particularly those most affected by the economic crisis – the automobile and the construction industry. It aims to provide insights into the economic weight of these industries across the OECD, their knowledge intensity, their structure, how the crisis has affected them so far and how it might affect them in the long run. Following this introduction, Part 2 provides a general discussion on the possible effects of the crisis on innovation, business dynamics, and industrial renewal. Part 3 provides an industry outlook for the two industries that are among the most affected by the current economic crisis, namely the automobile and construction sectors, and examines the implications of the crisis for these two industries. And finally, Part 4 provides a discussion of the current and future role of government in OECD economies and draws some broader conclusions.

The work is part of a wider OECD effort to help governments address the economic crisis. As member countries face up to these challenges, the OECD is working to help governments soften the impact of this crisis for those who will be worst hit and to lay the foundations for a stronger global economy for the generations to come. The OECD's Strategic Response to the Crisis covers two main areas.¹ First, it emphasises the need to align regulations and incentives in the financial sector to ensure tighter oversight and risk management. And then it urges governments to review and upgrade their national policies and improve international co-ordination in order to restore the conditions for economic growth.

The crisis and creative destruction²

Impact of the crisis on innovation and industrial renewal

Economic crises are historically times of industrial renewal. Less efficient firms fail while more dynamic ones emerge and expand. Creative destruction is an essential engine of long-term efficiency in market economies, and it intensifies in downturns. New business models and new technologies, particularly those allowing a reduction in cost, often arise in downturns, as was the case with low-cost airlines which grew out of the recession of the early 1990s. Many of today's leading firms such as Microsoft or Nokia were born or transformed during economic contractions. As dominant players weaken, they open space for new players and innovators.³

Innovation is an important driver of industrial renewal. The introduction of innovation in the form of new consumer goods, new methods of production or transportation, new forms of industrial organisation, or new services provides the impulse that sets and keeps the capitalist engine in motion (Schumpeter, 1942). Schumpeter portrayed long-term economic growth as driven by the innovative market entry of new successful firms that at the same time were destroying the value of established companies. One of the most cited examples of the process of creative destruction is the case of cassette tape, replaced by the compact disc, replaced in turn by MP3 players.

1. See www.oecd.org/crisisresponse for more detail.

2. This section draws, amongst others, on a recent OECD paper entitled "Policy Responses to the Economic Crisis: Investing in Innovation for Long-Term Growth", June 2009, see: http://www.oecd.org/document/28/0,3343,en_2649_34223_42983708_1_1_1_1,00.html.

3. An interesting perspective on this issue is provided in a recent paper (Kaufmann Foundation, 2009).

Innovation, particularly when it is disruptive and revolutionary, triggers what Schumpeter called waves of 'creative destruction' in the economy and subsequently generates new cycles of economic growth. In this respect, an innovation may create crises for otherwise successful firms (Christensen, 2000), industries and economies (Freeman 1986; Perez, 1997), particularly when these fail to notice the extent of the change and adjust to its implications. However, when firms do adjust and innovate, new firms and new business models may emerge (Box 2).

The current economic crisis, however, is not the result of the emergence of a superior innovation that has rendered some existing industries obsolete. Nor is the crisis in the automobile and construction sectors today the direct consequence of competing technical models or alternative solutions, or of the realignment of business models along new innovative trajectories. Instead, today's economic crisis is the result of a sharp change in demand conditions which resulted from a severe financial crisis leading to a major credit squeeze. Unlike a crisis driven by innovation and industrial renewal (*i.e.* supply factors), an economic crisis caused by demand factors does not automatically translate into an opportunity nor is it always synonymous with 'creative destruction' as described by Schumpeter (1942). On the contrary, it often generates destructive forces that bring economic growth to a halt and weaken the dynamics of innovation and industrial renewal.

An economic crisis caused by demand factors can derail the long-term prospects for economic growth and competitiveness of an economy through one or more of the following adverse effects: *i)* it may restrict the entry of innovative start-ups that are still at the creation phase due to high entry barriers; *ii)* it may precipitate the decline of young innovative firms which are experiencing a reduction in cash flow and which cannot seek help from a fading financial system, nor from exit markets (*e.g.* IPOs or mergers and acquisitions), *iii)* it may force established firms to shelve and shy away from new projects, and *iv)* it may slow down knowledge transfer, diffusion and adoption along local and international value chains.

Box 2: The Swiss watch-making industry: Renewal through new business models

At the beginning of the 1980s, watch making in the Swiss Jura went through a major crisis due to technological change and direct competition from Japan and Hong Kong, China. Two-thirds of the jobs related to the industry were lost. But this traditional industry bounced back in a few years thanks to a radical transformation of its products and business model. Previously, the essential characteristics of a Swiss watch were its precision and its reliability. With new quartz technologies, precision and low costs could also be achieved by new competitors.

Industrial renewal took place through the introduction of a new business model based on aesthetics and culture. In terms of aesthetics, watches were made of every possible type of material (such as metal, plastic, wood, stone), and in all possible shapes (watches as pendants, brooches, etc.) and all colours. In terms of cultural content, watch making became associated with symbols, images, cultural heritage, and became a means of communication. Specialists in design, marketing, image concepts, sponsoring and advertising began to become involved in the work. The watch became an object to be shown and a means of distinguishing social status. The result was that despite a sharp drop in the number of watches exported, the value of Swiss watch exports remained stable and then increased steadily in an expanding market.

This transformation occurred in a highly decentralised way, and involved numerous companies. A large number of these firms were created in order to market a single collection. The entire period is thus characterised not by planning, but by experimentation, imitation and differentiation. While investments focused massively on communication and image, a further development emerged in parallel with that described above: that of the renewal of the mechanical watch. Around 1980, a few enthusiastic entrepreneurs, fascinated by the micromechanics of watch making, took it upon themselves to inject new life into this tradition. They also mobilised former designers and craftsmen who had been trained during the 1930s.

The new business model was above all centred on a marketing concept, with know-how embracing many factors at once: culture, lifestyle, production and advertising. Most brands set up exhibitions or company museums to indicate their historical roots. The mechanical watch, whose highly specialised technology seemed doomed to extinction, was once again of interest to practically all manufacturers, including and above all the largest groups and represented a greater value than quartz watches among Swiss exports.

Source: Kebir & Crevoisier, 2008.

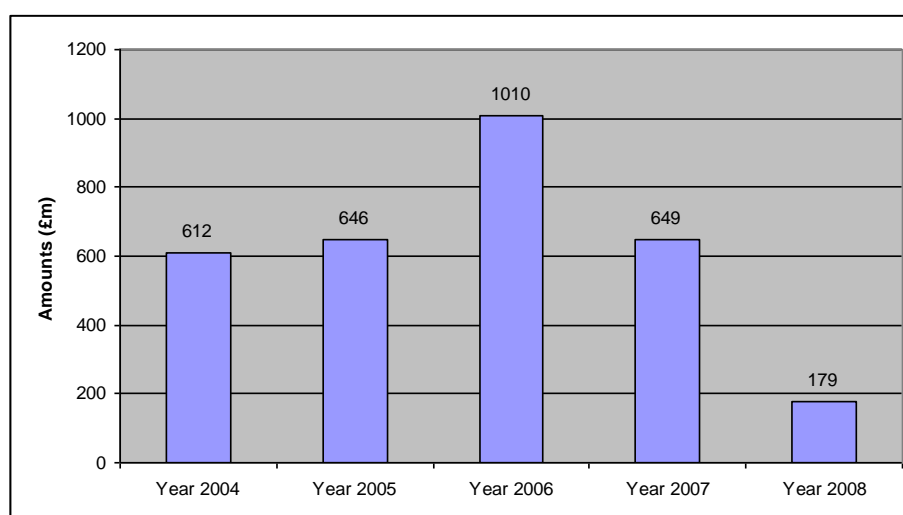
These adverse effects of a recessionary crisis pose a threat to the ability of industries to adjust to the crisis. In particular, the ability of firms to realign their competencies and businesses for the benefit of further specialisation (*e.g.* moving up the value chain) and to improve productivity (*e.g.* investment in human capital, fixed capital or process innovation) will be severely hampered. Furthermore, adjustment requires the ability to invest in new linkages across industry and business lines (*e.g.* in pursuit of diversification, new markets), as well as in new markets (*e.g.* marketing new products and services, after sales services, infrastructure, training, etc). During a time of diminishing market prospects and financial constraints, allocating resources for adjustment and renewal becomes more difficult.

To seize the opportunities provided by a crisis, government policy will be ill advised to encourage firms and industries with low productivity to stay in the market. Instead, government policy may focus on a number of pivotal challenges that can make a difference in transforming the economic crisis into a creative force (*i.e.* industrial renewal). In particular, the challenge for government policy is to *i)* foster opportunities for new businesses in emerging sectors (new technologies, knowledge-intensive services, green industries, etc.), *ii)* create conditions that help, small innovative firms grow, *iii)* help existing industries restructure and renew, and *iv)* help sustain and develop value chains.

Impacts on firm entry and exit

New firms play a key role in a dynamic innovation system, particularly in exploring new areas of demand and new technological opportunities. There are signs that the current crisis may be having a negative effect on the number of start-ups entering the market. The growing aversion to risk and the lack of exit opportunities for investors are also drying up many sources of seed and venture capital. Recent trends in venture capital investments in the United States show that total investment in venture capital is decreasing and that the fall has been strongest for new ventures (NVCA, 2009). Likewise, data from the United Kingdom shows the dramatic slowdown in the amount of funds raised for seed capital (Figure 1).

Figure 1. Amounts raised by UK-based venture capital funds



Source: Data based on VentureXpert and NESTA.

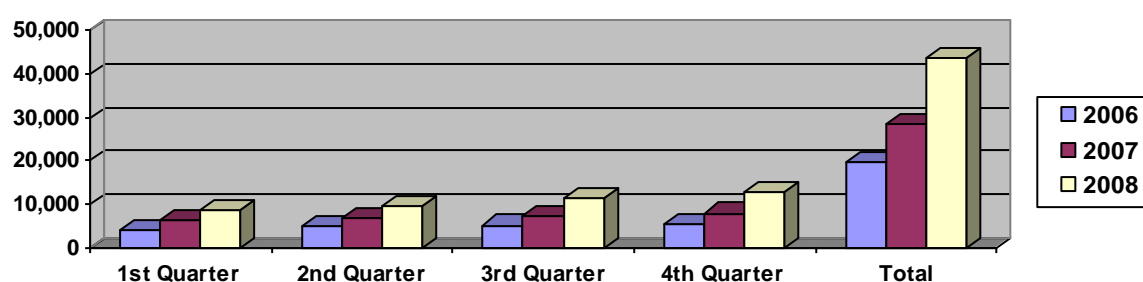
The current economic crisis (particularly through the credit squeeze) may have weakened the process of dynamic reallocation of resources (*i.e.* from old industries to new ones) towards the creation and expansion of new innovative businesses. This has a detrimental effect on long-term economic growth, as it means that the pool of technological and market alternatives for the future is reduced.

The overwhelming majority of firms affected by the crisis are small- and medium-sized firms. This is not surprising given the share of these enterprises in the economies of most OECD countries where firms with fewer than ten employees represent three-quarters or more of the employer firm population. With the reduction of cash-flow the innovative potential of these firms is constrained. This is a source of concern, as the performance of firms is largely dependent on their innovation strategy and capacity.

The crisis is already affecting firm survival. According to the bankruptcy filing statistics released in March 2009 by the US Administrative Office of the Courts, the Chapter 7 bankruptcies basic liquidation for individuals and businesses in the United States increased 43% from December 2007 to December 2008. Business bankruptcies increased 54% from 31 December 2007 to 31 December 2008 while non-business bankruptcies increased 31% for the same period (Figure 2). (US Administrative office of the Courts, 2009.) In Western Europe, more than 150 000 firms from 17 countries filed for bankruptcy in 2008. The biggest increase in bankruptcies was in Spain followed by Ireland and Denmark (Creditreform, 2009).

Figure 2. Business bankruptcy filings in the United States

(years ended December 31, 2006-2008)



Source: U.S Administrative Office of the Courts.

The small enterprise sector experiences specific difficulties in periods of economic and financial crises. For small or young enterprises, the most important sources of financing are their own cash flow, retained earnings and bank loans. The cost of obtaining loans has risen considerably for SMEs, as the risk of default is taken into consideration more strongly. In addition, their earnings suffer as a result of a weaker economy and the delay in payment from customers tends to worsen in difficult economic times. For example, short-term financing arrangements have become subject to higher costs and risk premiums since the beginning of the crisis. Banks are not only restricting lending, but are also attaching more stringent conditions to loans, requesting collateral, assessing equity ratios and credit standing.

Not only entry and survival have become more difficult for small firms, but so has exit. Many innovative start-ups have, as their strategy for further growth, exit strategies that involve mergers and acquisitions, or going public. The current economic crisis has made it very difficult for such firms to go public and has softened (but did not halt) acquisitions activity. For example, two quarters in 2008 saw no venture-backed IPOs in the United States, the first time since 1975. As a result, new investments and fundraising have continued to slow down considerably in 2009 (NVCA, 2009).

Impacts on innovation in large firms

There are indications that the crisis is having a negative impact on innovation activities, particularly technological innovation. This is witnessed by the slowdown in international patenting activities where international patent filings under WIPO's Patent Cooperation Treaty (PCT) grew by 2.4% in 2008, as compared to an average 9.3% rate of growth in the previous three years. Likewise, trademarks filing activity was stronger in the first six months of 2008 (+6.9% compared to the same period in 2007) than in the second half of 2008 (+3.9%) mirroring a slowdown in global economic conditions. According to WIPO, historically, patent filings tend to dip during periods of economic difficulty simply because fewer resources are available for investment in the innovation cycle. Once the economic cycle improves, patenting activity tends also to recover.

Business R&D and new patents increase when GDP increases, and slow down or shrink when GDP slows down or declines.⁴ New patents and business R&D were directly hit during the two most recent downturns, in the early 1990s and early 2000s. Estimates for the United States, for example, suggest that 1 point of change in GDP translates into 0.5 to 1 point of change in business R&D, and the effect of economic growth on R&D is almost immediate. Corporate reports for the fourth quarter of 2008 in many cases already show a decline or slower growth in R&D spending; forecasts for 2009 confirm the trend (OECD, 2009c).

New trademarks, as well as patents and R&D, were hit during the two downturns of the early 1990s and early 2000s. The major reason for the pro-cyclical character of innovation is that investment in innovation is highly sensitive to the financial constraints faced by firms, which are more stringent in downturns. The reluctance of financial institutions to fund innovation could be even stronger in the current downturn, which originates from over-lending (although not primarily to innovative firms) by the financial sector. The current economic context tends to discourage risk-adverse behaviour by financial institutions and markets, and innovation could suffer as a consequence.

There is also a risk that some benefits of pre-recession expenditures on innovation might be lost, *e.g.* if research projects which were started before the downturn are prematurely interrupted – especially if this occurred at the stage of commercialisation, which is the most expensive phase in the innovation cycle. Moreover, many firms will have a strong incentive to temporarily redirect their innovation capacities towards cost-cutting projects, to the detriment of more ambitious market-expanding endeavours.

The crisis can, however, also magnify the competitive advantage of research-intensive firms who seize the opportunity to reinforce market leadership through increased spending on innovation and R&D. Many of today's leading technology firms such as Samsung Electronics and Microsoft strongly increased their R&D expenditures during and after the new economy bust of 2001.

⁴. OECD Patent database.

Impacts on knowledge flows and global value chains

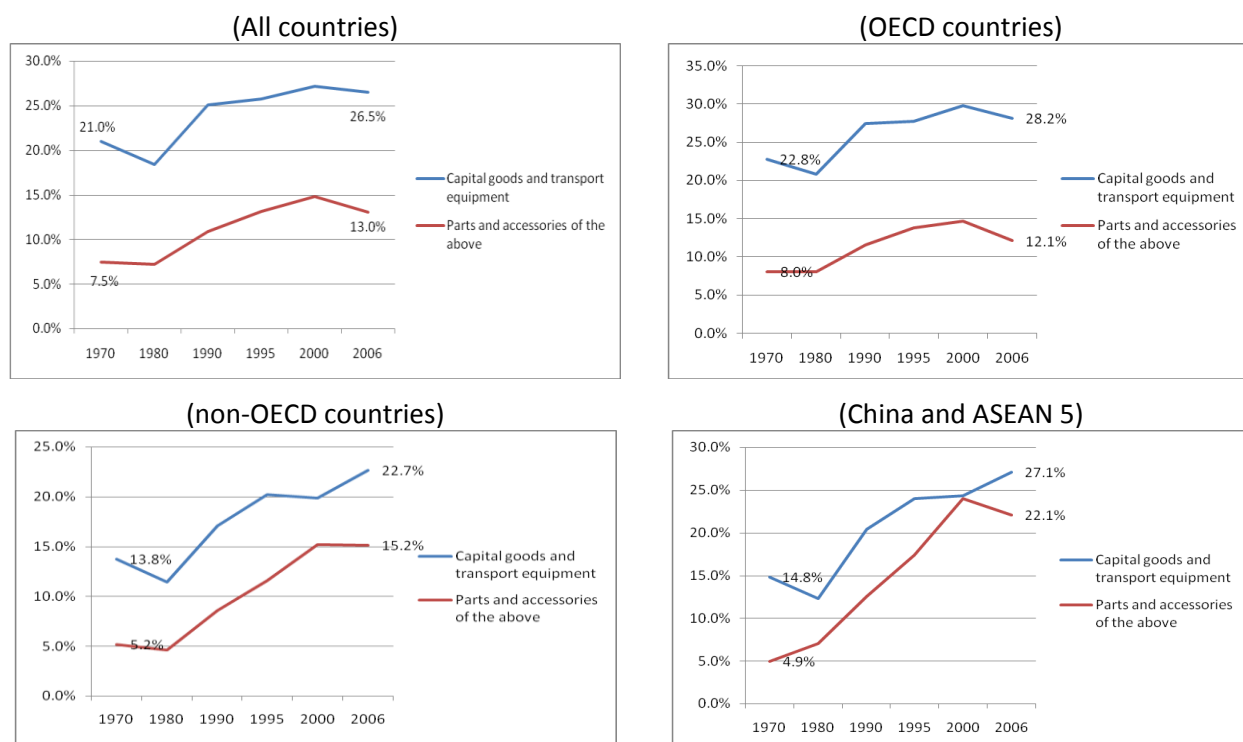
Most innovations occur through and draw on the absorption of ideas, knowledge or expertise generated beyond the boundaries of one firm, city or country (Bhide, 2008; OECD, 2008). The knowledge and expertise of suppliers, complementary developers, and consumers often provide the supporting environment for the generation and diffusion of an innovation (Afuah & Bahram, 1995). This has resulted in growing interdependency between firms in different countries, which is also reflected in the growing size of intermediate goods (55%) and services (75%) in global trade (OECD, 2009a).

Over the past few decades, the share of trade in capital and intermediate goods in total trade has risen considerably (Figure 3). The share of capital goods in total trade increased from 21.0% in 1970 to 26.5% in 2006. More significantly, the share of intermediate goods in total trade increased from 7.5% to 13.0%. While such a trend can be seen both in OECD and non-OECD countries, the increase is more pronounced in non-OECD countries in particular China and the ASEAN.⁵ The growing trade of intermediate goods is reflected in the decrease of so-called production depth (value added as a percentage of production) in many OECD countries (OECD, 2008). The ratio of imported intermediates to domestic intermediates has also increased between 1995 and 2000 in many OECD countries (OECD, 2008).

There are a number of signs that international value chains and networks are indeed under strain. For example, export volumes of the G7 countries fell by almost 10% between the third and fourth of 2008 and then accelerated further in the first quarter of 2009, falling by 13.6%. The current expectation for 2009 is that world trade volumes might fall by 16% from 2008 levels.

Trade in services has also been affected by the crisis. The average export volumes of services of OECD countries stagnated between the second and the third quarter of 2008 and then fell sharply by 17% between the third and fourth quarter. Outsourcing and offshoring services have also suffered from the crisis. Estimates suggest that 20 to 40% of the US market for offshore outsourcing stems from the hard-hit financial services industry (Everest Research, 2009). In 2008, the total value of deals in the sector dropped by 28% to USD 18 billion, the lowest value since 2001 (Technology Partners International, 2009).

⁵ See for example, Ando (2006) and Ando and Kimura (2007) for analysis of production networks in East Asia. Ando finds that intra-regional trade in East Asia expanded 6.7 times between 1981 and 2001 compared to 3.1 times globally.

Figure 3. Trade in capital and intermediate goods (all countries)

United Nations Broad Economic Categories. Capital goods and transport equipment include categories 41, 51 and 52. Intermediate goods only include categories 42 and 53, and exclude food and beverages, industrial supplies and lubricants which are often included in intermediate goods.

Source : OECD, based on UN COMTRADE.

Apart from the recent decline in trade volumes, flows of foreign direct investment (FDI) are expected to decline too. In the comparably mild downturn of 2001, global FDI flows declined by almost 50%. A similar decline in 2009 would reduce global FDI flows by about USD 900 billion (OECD, 2009b).

The downturn in trade and FDI could be particularly damaging to firms significantly dependent on sourcing from overseas, such as firms in the automobile industry. The crisis might sever the important linkages between industries in different countries resulting from the complex sourcing strategies of firms. For example, the average Japanese automaker's production system comprises 170 first-tier suppliers, 4 700 second-tier suppliers, and 31 600 third-tier subcontractors, many of which are overseas in Europe, North America and Asia (Hill, 1989).

The risks to global value chains emerge not only from the decline in international trade, but also from key suppliers facing bankruptcy, and from firms re-considering their investment strategies and retrenching to core markets. In the current crisis, companies may re-internalise some activities as they want to protect themselves against the possible disruption of these chains. A sharp decline in trade, foreign direct investment and access to international financing, poses a risk to the global supply chains that underpin innovation. These supply chains are critical sources of new knowledge and learning for firms. They provide companies with technical expertise, knowledge of foreign markets, critical business contacts and international partners. Firms developing more radical or complex innovations are more likely to have co-operative arrangements for innovation with external partners along the supply-chain than less innovative firms (Tether, 2002). The current decline of trade and investment flows could have important consequences for these knowledge transfers and for innovation at the global level.

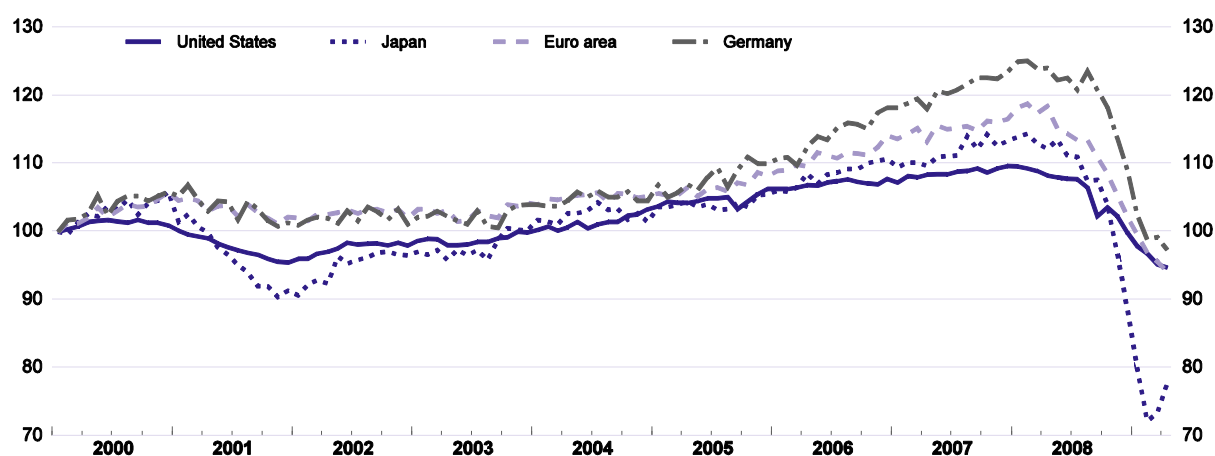
Protectionist policies could exacerbate these risks. They would increase the input costs for domestic industries and would penalise exporters twice, through higher costs and through retaliation from other countries. Internationally co-ordinated government responses can help address these risks, can produce a more effective, longer-lasting solution and can also result in positive spill-over effects.

The crisis and the automobile and construction industries

The economic crisis from the perspective of two industries

The general impacts of the crisis that are discussed in the previous section are amplified in some sectors that have been most exposed to the crisis. The downturn induced a collapse in industrial production in the second half of 2008 (Figure 4). Apart from the banking sector, the two industries most directly affected by the crisis are the automobile industry and the construction sector. In the automobile industry, the financial crisis and the resulting credit squeeze has led many consumers and firms to postpone their purchase of new cars. In construction, the collapse of the housing bubble in several countries and the credit squeeze in most OECD countries has led to a sharp decline in both residential and non-residential construction. Moreover, in both cases the credit crisis has highlighted existing structural problems in these industries. Even before the crisis, the automobile industry was considered to have considerable overcapacity (KPMG, 2009), while the construction industry in some regions of the world was affected by a substantial housing bubble.

Figure 4. Industrial production in OECD countries, January 2000=100

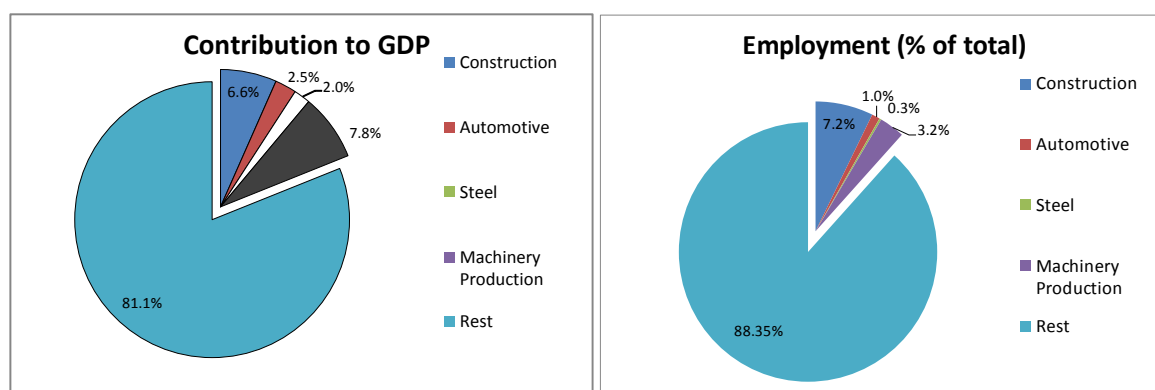


Source: OECD Economic Outlook 85, based on Datastream.

Together, these industries account for a significant part of the economy, and have important interactions with supplying industries, such as the steel and machinery industries. Collectively, they account for approximately 10% of total employment in OECD countries and generate around 9% of GDP (Figure 5). The automobile industry includes companies that are involved in production of cars and commercial vehicles, including their design, development, testing, manufacturing, and sales. The construction industry encompasses construction of building segments (such as residential, industrial or commercial), heavy and civil engineering (e.g. highways, tunnels, etc.) and specialised construction related activities such as painting, plumbing, and electrical work.

Figure 5. The role of the automobile and construction industry in OECD economies

Shares in OECD GDP and employment (2007 or latest available)



Note: OECD Averages.

Source: OECD STAN Database.

International linkages are also important in these industries, in particular for the automobile industry. The world export volume of automobile products reached USD 1.18 trillion in 2007 (WTO 2008), accounting for 8.7% of world merchandise exports in 2007. This is more than world exports of agricultural products, which amounted to USD 1.13 trillion in 2007. Only two other categories of manufactured products accounted for a higher share of world exports in 2007, namely telecommunications equipment (11.1%) and chemicals (10.9%) (Table 1). Exports from the EU-27 amounted to USD 635 billion, representing 53.7% of the total export value, followed by Japan and the United States. As for construction exports, this totalled USD 60 billion in 2006, representing about 4% of other commercial services exports. This volume is 5% of that of automobile exports.

Table 1. World merchandise exports by product group, 2007 (billion USD, %)

	Agricultural products	Fuels and mining products		Manufactured products				
		Total	Fuels	Total	Iron and steel	Chemicals	Office and telecom equipment	Automotive products
Value	1128	2659	2038	9500	474	1483	1514	1183
Share in world merchandise trade	8.3	19.5	15.0	69.8	3.5	10.9	11.1	8.7
Annual percentage change								
1980-85	-2	-5	-5	2	-2	1	9	5
1985-90	9	3	0	15	9	14	18	14
1990-95	7	2	1	9	8	10	15	8
1995-00	-1	10	12	5	-2	4	10	5
2000-07	13	21	20	12	22	17	8	13
2005	8	38	43	10	17	12	11	7
2006	11	28	23	13	18	13	14	11
2007	19	15	13	15	27	19	4	16

Source: WTO 2008.

The automobile industry

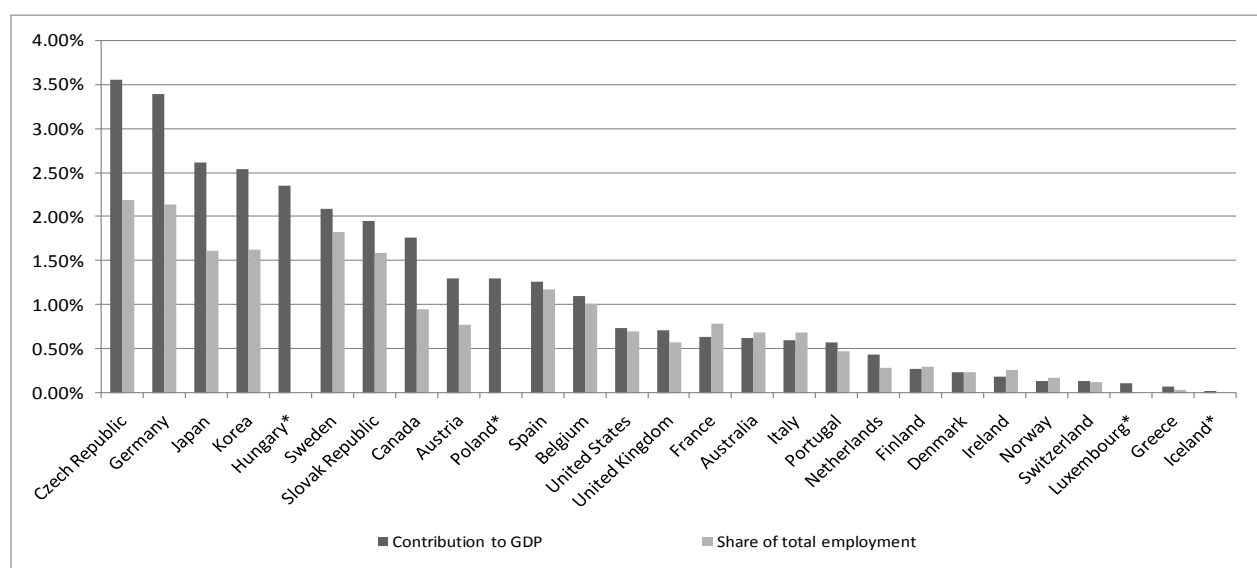
Industry overview

The automobile industry is labour and capital intensive, globalised and export-oriented. These characteristics summarise many of the policy challenges involved in helping the industry manage the current economic crisis: a slump in orders of unprecedented speed and scale has heavily affected this sector. Its relatively large size and high level of labour intensity have made this sector politically sensitive, and its high degree of internationalisation increasingly implies that many firms and governments are involved in the process of industrial restructuring in the industry.

The automobile industry's weight in the economy in terms of value added goes up to almost 3.5% in some OECD countries such as Germany and the Czech Republic (Figure 6). In some OECD economies the automobile sector is also a significant employer. The total share of workers employed by the automobile industry represents up to 2% of total employed in OECD countries, with the exception of Germany and the Czech Republic where employment shares are above 2% (Figure 6). As the automobile industry indirectly involves various service activities such as car financing, insurance, dealers, and maintenance, an even larger number of people are employed in the automobile value chain. For example, in the United States, total automobile-related employment, including both manufacturing and services, has been estimated at 3.3% of total US employment (Cooney, 2008).

Figure 6. Automobile sector: employment shares and contributions to the GDP

(percentage, 2007 or the latest available)



* Employment data not available

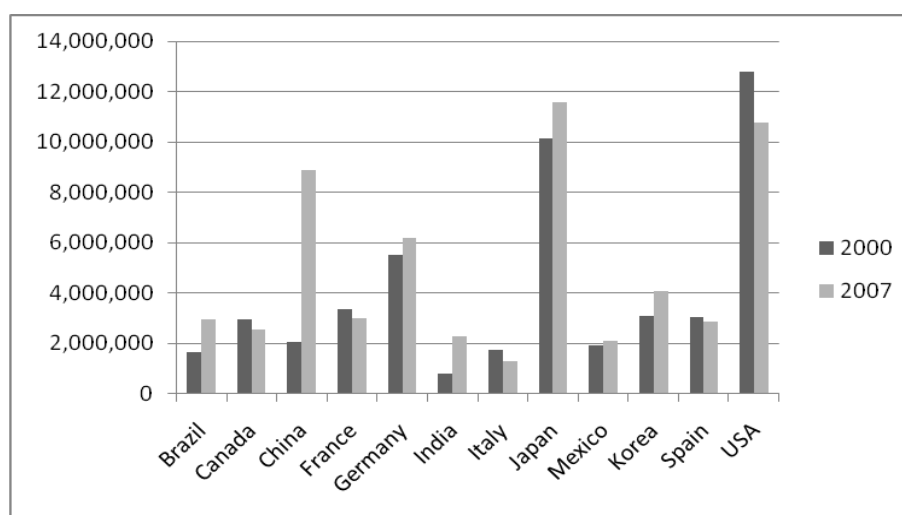
Source: OECD STAN Database.

With the exception of a few countries, employment in the automobile industry has been relatively stable (or on the increase) over time.⁶ There has also been no major shift in jobs from one place to another. While there has been some relocation of activities from high-wage to low-wage industrial countries, the rapid growth of the car market in low-income countries is the key factor that is

⁶. Source: OECD STAN Database.

progressively moving the automobile sector to Asia. Between 2000 and 2007, the global production shares of the United States and Japan fell from 40% to 30%, while the share of the non-OECD countries increased – from the production of one car in ten in 2000, to one car in five in 2007 (Figure 7). The five producers with the highest increase in production shares are all Asian.⁷ This relocation trend is therefore part of a broader trend towards globalisation with a growing role of non-OECD countries, instead of a decline in this industry as such. For example, the share of employment in the automobile industry in the EU-25 has remained stable over the past years.

Figure 7. Motor vehicle production by country (units)



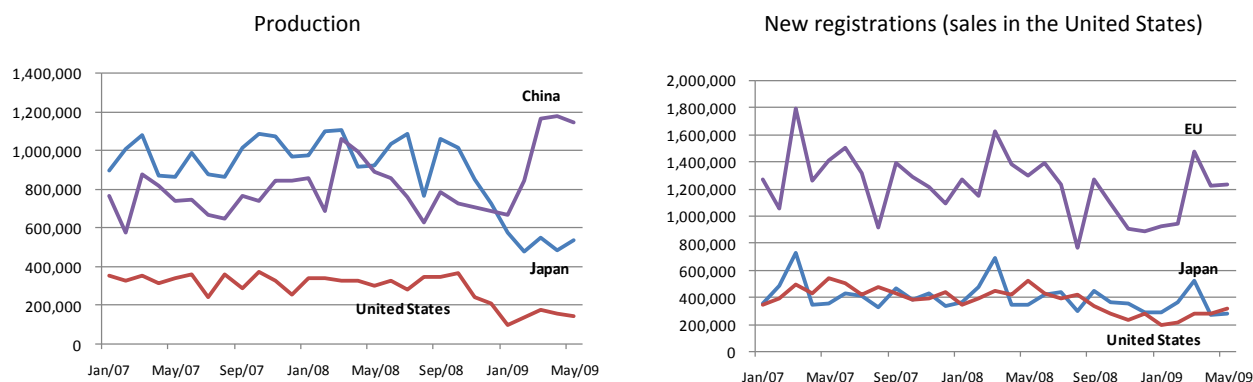
Source: OICA data.

The effect of the crisis on the automobile industry

The current global recession has had an unexpectedly large impact on the global car market. Although demand for cars always contracts during recessions, as households and businesses cancel purchases of large expenditure items, the lack of access to credit is exacerbating this effect (Figure 8). In addition, previously high oil prices and slowing household income growth, due to worsening labour market conditions, has also contributed to dampening car purchases.⁸ These factors were evident in the collapse of automobile production and exports around the world in the beginning of 2009. North America, Europe and Japan, which account for around 70% of world car production, were badly affected. Demand indicators, however, are showing some signs of recovery, especially in the EU, while China's production has also remained strong.

7. Three from Japan (Toyota, Honda and Suzuki) and two from Korea (Hyundai and KIA).

8. Moreover, the increased quality of cars has enhanced their durability, making it easier to postpone purchases.

Figure 8. Monthly production and demand for passenger cars in selected economies

Sources: China Association of Automobile Manufacturers, ACEA, and WARD's.

In the United States, the total value of motor vehicle output was USD 331.3 billion in the third quarter of 2008 (Cooney, 2008). In September 2008, total employment in all categories of automobile manufacturing was 857 000, down about 30% from 1.2 million in 2001. In North America as a whole, vehicle production by June 2009 had contracted by almost 50% as compared to June in the previous year.

The downturn in the North American motor vehicle sector appears to have intensified in the beginning of 2009. First-quarter vehicle production fell by 51%, almost double the rate of decline observed at the end of 2008 and production has remained weak into May. Most of the output contraction occurred in January, as manufacturers stopped production to reduce car dealers' excess inventories. Production is expected to remain relatively weak in the near term although there are some signs that the recession is bottoming out. Chrysler, which has just started to reorganize under Chapter 11 of the U.S. bankruptcy code, announced that it would shut production at most of its plants until a partnership with Fiat is finalized. In addition, General Motors shut production at 13 plants, in an attempt to bring production in line with demand (Box 4). Nevertheless, some leading indicators are suggesting that a slight improvement in demand may take place in the future. According to the Global Auto Report (Scotia Economics) used car prices are beginning to strengthen in the United States and Canada, which tends to raise the trade-in value of vehicles and spurs new sales. Past history also suggests that new vehicle sales start improving around one year before the peak in unemployment.

In the EU, the main vehicle-producing countries (Germany, France, Italy and Spain) posted steep declines in production in 2008. According to data released by the European Automobile Manufacturing Association (ACEA) in July 2009, passenger car registration in Europe declined for fourteen consecutive months in 2008 and 2009, before registering a modest pick-up in June 2009 (Figure 9). Overall, the automobile market in Europe was down by 11% over the first half of 2009. In response to this downturn, various scrapping schemes were introduced between December 2008 and April 2009, which are designed to stimulate consumer demand while supporting policies to reduce emissions. The schemes offer rebates on older cars (typically 10 years or older) that are traded in for new, lower-emitting ones (Table 2).

Table 2. Selected vehicle scrapping schemes implemented in the EU

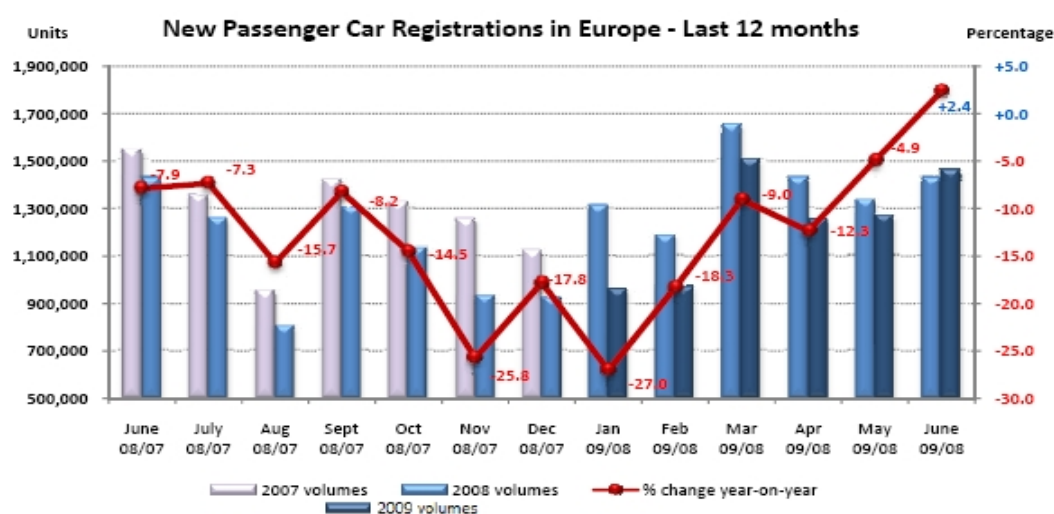
Country	Incentive	Vehicle age (years)
Austria	EUR 1 500	> 13
France	EUR 1 000	> 10
Germany	EUR 2 500	> 9
Italy	EUR 1 500 - 5 000	> 9
Luxembourg	EUR 1 500 - 1 750	> 10
Portugal	EUR 1 250 - 1 500	> 8 / > 13
Romania	EUR 900	> 10
Slovak Republic	EUR 1 000 - 1 500	> 10
Spain	Interest free loan up to 10 000	> 10 / 250 000 km
United Kingdom	GBP 2000	> 10

Source: European Automobile Manufacturers' Association (ACEA), national sources.

These schemes appear to be having a positive impact on new car registrations, particularly in Germany which offers one of the highest rebates at EUR 2 500. The European market was on the rise again from February, even taking into account seasonal effects. New car registrations in Europe were up considerably in June, in part due to recent measures including the car renewal schemes in a number of countries (Figure 9). For example, new car registrations in Germany went up by 30% in February after the launch of the scheme and in France, about 20% of all cars sold in January 2009 had benefited from this scrapping incentive. The scrapping scheme introduced by the United Kingdom on 18 May is considered to have accounted for about 10% of car sales in June 2009.

While the schemes thus seem to have boosted short-term demand for cars, questions have been raised as to the impact they might have in the longer term. Most schemes are temporary and consumers are therefore likely to move their spending plans ahead to match the schemes duration. Once the scheme ends, sales are likely to drop substantially. It is also not clear how the profitability of the industry will be affected by the schemes that mainly favour small and cheap cars.

Figure 9.



Source: www.acea.be.

Japan and Korea have also been hit heavily by the automotive industry downturn, with export volumes plunging steeply at the end of 2008 and into early 2009. According to the latest figures by the Japan Automobile Manufacturers' Association (JAMA), Japan's automobile production plunged a record 41% year-on-year in May as exports fell by more than half to 233 217 vehicles in May 2009. This is the sharpest decline since the start of data in 1967. Domestic sales declined by 19% over the same period. The introduction of green tax schemes in Japan and tax incentives in Korea for consumers trading in older vehicles are expected to provide some support to domestic sales going forward.

The situation in emerging markets is better for vehicle manufacturers, supported by stronger domestic demand developments and various stimulus plans. In China, sales growth in the first quarter of 2009 amounted to only 7%. The automotive stimulus plan launched in early 2009, however, appears to have boosted sales, that were up by 34 and 36% respectively in April and May. The stimulus plan lowers purchase taxes on small-engine cars, provides allowances for rural citizens to upgrade vehicles, and increases subsidies for scrapping old cars, among others. The government hopes that the stimulus will raise average growth in sales and production to 10% over the next three years. However, the extent to which growth will accelerate depends largely on developments in coastal areas, which are the main markets for vehicles in China. The drop in global demand for Chinese exports will continue to restrict economic activity in these areas, and thus could limit growth in demand for cars for some time to come.

Brazil, the leading producer in South America, experienced a drop in sales of 25%, year-on-year, in the fourth quarter of 2008. Sales appear to have stabilised since then, partly a consequence of tax cuts on small vehicles. The tax scheme was scheduled to expire at the end of March 2009, but was recently extended to the end of June.

Overall, global motor vehicle production is set to decline substantially in 2009 in all major regions of the world, despite positive growth in China. Industry analysts expect a slow recovery from low levels in 2010 supported by aggressive monetary and fiscal stimulus measures.

The prospects for industrial renewal in the automobile industry

Innovation is an important driver and enabler of competitiveness for the automobile industry (Box 3). Almost all features of a car are dependent on innovation: fuel efficiency, emissions, safety and security, seamless connectivity, information and entertainment, driving dynamics and performance, comfort, flexibility and space, etc. Innovation is also important to respond to the continuous cost pressure in the industry created by legislation, competition, increasing risk and stagnating customer demand (in many markets). Thus innovation activities in the industry are aimed at both product innovation (with customer satisfaction in mind) and process innovation (for cost efficiency and productivity).

These combined pressures imply that leading firms – typically those in OECD countries – need to generate knowledge intensive solutions based on developments in nanotechnology, flexible automation, electronics, fuel efficient engines and new fuels, and integrate these technologies and solutions within a single product. The complexities involved and the need for knowledge management and integration often imply that firms from OECD countries typically remain market leaders. However, firms from non-OECD countries may be able to respond better to the trend for cheap, small and fuel-efficient cars.

The global automobile industry has grown continuously over the past decades due to ever increasing global demand – largely from emerging markets. Global car production rose by a compound annual rate of growth of 2.44% from 1970 to 2007. Despite this apparent stable growth in demand, the automobile industry has experienced some major structural changes over the past decade, including mergers and de-mergers of major companies, record profits and bankruptcy of global suppliers and manufacturers. In recent years and preceding the current crisis, the automobile industry has started to face a number of structural challenges, including overcapacity and market saturation (KPMG, 2009).

Box 3. Innovation and the automobile industry

Using Keith Pavitt's (1984) classical taxonomy of innovation, the automobile industry could be described as one that consists of relatively few scale-intensive firms that are active in mass production, but which are supported by a much larger number of specialised suppliers and science and technology based firms.

The automobile industry is classified as a medium high-tech manufacturing sector (see OECD *Frascati Manual*), but this reflects the state of the industry across the OECD as a whole since it is based on OECD average investment figures. For some countries such as Germany and Japan, this industry can be considered a high-tech sector investing substantial funds in R&D and employing a large number of R&D personnel.

Business R&D expenditure is notably high in OECD countries with strong car industries. According to the OECD R&D database, this expenditure has been on the rise in Germany, France, Japan, and Korea throughout the period 2000-2006. Japan spent the equivalent of USD 16 billion in 2005, while Germany spent about USD 14 billion in 2006. France and Korea's business R&D expenditure reaches about USD 4 billion annually, while other OECD countries such as Australia, the Czech Republic and Spain spend between USD 0.3 and 0.5 billion annually.

The number of R&D personnel in the industry continues to grow in both Germany and Japan. Germany had up to 90 000 persons employed in R&D activities in the automobile sector in 2006, while Japan employed over 80 000. France and Korea also had a relatively large number of R&D personnel in the automobile sector in 2006: over 30 000 and just under 20 000 respectively.

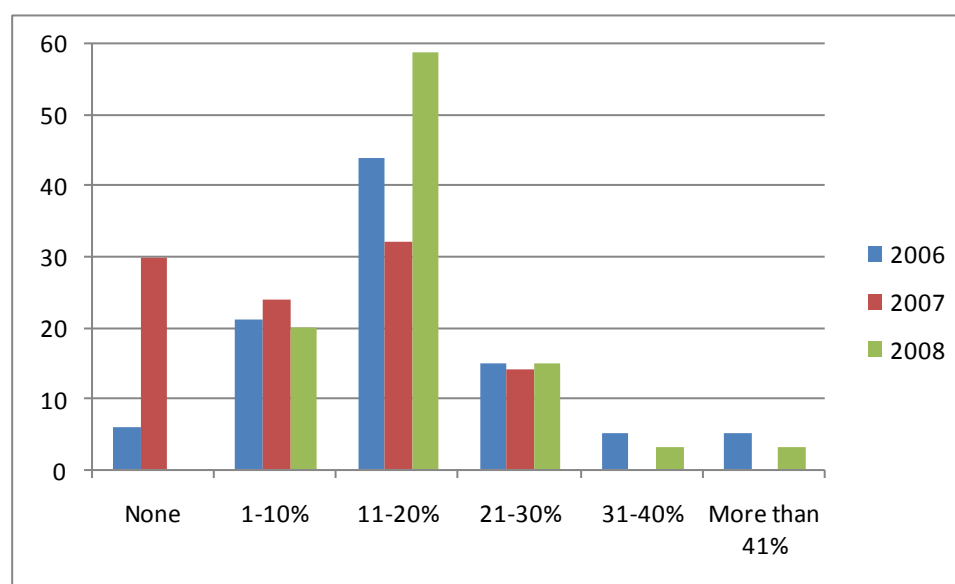
The knowledge intensity of the industry in various OECD countries can also be captured by the level of education of its workforce. The OECD ANSKILL Database shows that among the countries with a large automobile sector, the percentage of highly skilled employed in the automobile sector is exceptionally high in Spain, Germany, the United Kingdom and France. It remains lower in the Czech Republic and Slovakia. This variation in the level of skills may be an indication of an increased specialisation and shift along the value chain among OECD countries, particularly in Europe.

Innovation and restructuring might address these challenges, but the current crisis may also make some of the necessary changes more difficult. The reduction in cash flows resulting from the crisis could affect the necessary investments in innovation, *e.g.* in cleaner engines or batteries, making it more difficult for firms to meet emission reduction targets and regulatory measures.

Moreover, many of the small high-tech suppliers in this industry are affected by the crisis and might go out of business, especially those that are located outside the direct automobile value chain (where the automobile industry is one client among many). For example, a typical European vehicle manufacturer is usually engaged with several hundreds of suppliers. These lower tier firms (Tier 2-3) are often SMEs with limited capital and any changeover of suppliers in the middle of production will be costly and time consuming.

These crisis-related challenges are augmented by the large overcapacity in the industry. The most recent KPMG survey of global auto executives, for example, suggests that most respondents consider the industry affected by a considerable degree of overcapacity, a problem which has only been amplified by the crisis (Figure 10). For example, 30% of industry executives considered that the industry had no overcapacity, whereas all executives now indicate that they believe that there is overcapacity in the industry. Moreover, the percentage of industry executives indicating that industry overcapacity is between 11 and 20% rose from 32 to 59% from 2007 to 2008 (KPMG, 2009). Moreover, the sensitivity over job cuts can result in strategies that aim at job preservation rather than at innovation and restructuring.

Figure 10. Views of car executives on global overcapacity in the car industry



Source: KPMG, 2009.

Despite these challenges, the crisis may also provide opportunities for the industry to address structural inefficiencies at the global level. A more efficient division of labour of the industry internationally could result in lower-cost but higher-quality products developed by players from around the world. This will, however, require stronger links and partnerships between suppliers and car companies and possibly new forms of collaboration with new partners – including customers, vendors and even competitors – to drive a more efficient allocation of resources.

The crisis may also provide an opportunity for existing automobile supply chains to diversify their business portfolio. Many automobile supply chain firms have deep knowledge and expertise in areas such as ICT, new materials, and design and can serve more than one industry. This would also allow firms to export capacities to more than one industry or business and thus enable them to gain more financial returns for additional investments in innovation. The automobile supply chain could become a knowledge source of its own and achieve greater independence from the automobile industry by adopting business diversification strategies, tapping into their expertise in electronics, information systems, materials, aerodynamics, etc. While for many auto-part makers this can be difficult to achieve due to lack of scale or capacity, some large auto-part makers (*e.g.* Magna International) are diversifying by moving into, among others, the aerospace sector.

Moreover, the crisis might contribute to innovation in new business models introduced by new players to the sector such as energy companies, or existing supply-chain players such as parts-makers, or through new combinations of resources, technology, and expertise. Whether the current crisis will result in a new industrial structure (for example with fewer players in the automobile market) is not clear yet but remains a likely outcome. However, the current emphasis on developing greener technologies to reduce CO₂ emissions is likely to provide new opportunities to reinvigorate the global automobile industry, particularly through incentives for consumers and producers to experiment with radical innovations such as electric cars and new fuels.

Government responses and industrial renewal in the automobile industry

In response to the crisis, several countries have introduced financial packages aimed at preserving jobs, supporting manufacturers in the automobile industry and promoting new cleaner, more fuel-efficient vehicles. These measures have targeted consumers, automobile producers and auto-parts suppliers. The packages introduced, or announced, range from USD 17.4 billion in the United States to GBP 2.3 billion in the United Kingdom (Table 3). The measures include loans and loan guarantees, credits, subsidies and support for car demand, in return for which many governments are requiring the production of more energy efficient cars or providing incentives for the purchase of new cars.

Table 3. Examples of support packages for the automobile sector

Country	Amount of package	Linked to clean technologies	Incentives for new car purchase
Australia	AUD 6.2 bn	•	
Canada	CAD 4 bn		
France	EUR 6 bn	•	•
Germany	EUR 1.5 bn	•	•
Italy	EUR 1.7 bn	•	•
Korea	KRW 2 tr	•	
Luxembourg	EUR 4.5m	•	•
Mexico	USD 1 bn	•	
Norway	NOK 100 m	•	
Portugal	EUR 200 m	•	•
Spain	EUR 4 bn	•	•
Sweden	SEK 20 bn	•	
Turkey	TRL210m		•
United Kingdom	GBP 2.3 bn	•	•
United States	USD 17.4 bn		

The packages that have been introduced are substantial and sometimes involve major industry players (Box 4). However, most are aimed at helping incumbent firms to restructure and meet environmental targets rather than providing stimulus for the entry of new players to the automobile sector. In other words, government stimulus packages have largely sought to encourage incremental innovation within the industry rather than disruptive revolutionary innovation based on new sets of technologies (but not entirely – for example some governments are investing in the development of plug-in networks for electrical cars) (see also Table 4).

Table 4. Examples of stimulus measures aimed at supporting car demand

Country	Investments	Loans	Aim of measures
Australia	2.5b		Green technology, 55% of which to vehicle producers
Canada		CAD 4 billion	To keep companies operating while they restructure
France		EUR 6 billion	To invest in clean technologies
		6% interest rate	
		EUR 500 million	Assist auto-sector firms with operations in France
Norway	NOK 50 m		Improved infrastructure for electric and hybrid cars
	NOK 50 m		Development of biofuel
Spain	EUR 4 bn	EUR 800m *	Development/production of electric and hybrid cars
		0 % interest rate	
Sweden	EUR 300 m EUR 2 bn		R & D Conversion to green technology
		EUR 500 m*	
Turkey			Reduction in car and communications taxes
United Kingdom	GBP 250m		Consumer incentives and infrastructure development
	GBP 100m		R & D

* No conditions attached to loan.

Not all government support for the industry is aimed at restructuring and renewal however. Much aid is allocated to help companies facing problems with access to liquidity. For example, emergency loans are either destined to keep automobile companies operating whilst they restructure, as was the case with Canada (CAD 4 billion) or they are low-interest rate loans to fund investment in clean vehicle technologies as the case of France (EUR 6 billion). France is also providing EUR 500 million in loans to auto-sector firms with operations in the country. The United Kingdom announced a EUR 2.3 billion guarantee scheme for loans going into lower carbon initiatives. The European Investment Bank, the EU's main source of long-term funding, is providing more than EUR 7 billion to the automobile sector. The loans to the industry in the first six months of 2009 will probably amount to more than 10% of the total loan portfolio.

The Korean government announced that it had allocated KRW 18.3 trillion (about USD 14.2 billion) for an energy efficiency initiative that will run until 2012. To meet its targets, the government will provide incentives for companies that invest in energy efficiency and the development of technology in green cars. By 2012, automobiles should achieve a 16.5% increase in average fuel economy.

Some measures were put in place before the stimulus packages were announced. For example, France provided additional government aid for R&D expenditure by the automobile supplier sector during the period 2006-2008 that amounted to EUR 120 million. The government also raised the threshold for tax credits on R&D expenditure by 100% to EUR 16 million, and set aside EUR 150 million for assistance to employees of automobile supplier companies undergoing restructuring.

Support measures for the car industry go beyond OECD countries. For example, in China, taxes on small engine vehicles were reduced in January, effective until the end of 2009. Other measures under consideration in China include financial support to farmers who purchase motor vehicles and support for trial use of energy-saving vehicles. In South America, Argentina has announced a stimulus in the form of credit financed by the government for purchasing new cars. Much of Brazil's stimulus is also focused on the automobile sector, given its large share of the overall economy. Brazil's Industrialized Products Tax (IPI) was reduced in January 2009 for motor vehicles and auto parts. And Russia has announced interest-subsidised consumer credit for purchases of Russian-made passenger cars.

The automobile industry is a multi-tier industry composed of many suppliers and sub-suppliers, some of which serve many markets besides the automobile industry. The importance of the supply-chain has been explicitly recognised by some governments. For example, Australia's New Car Plan for a Greener Future Package includes capped assistance of AUD 1.5 billion over 2011 to 2015 and new capped assistance of AUD 1 billion over 2016 to 2020. Assistance will be in the form of grants and will be split with 55% going to vehicle producers and 45% to the supply chain. All participants will be eligible to claim 50% of their investment in approved R&D. Participants will be required to demonstrate progress towards achieving better environmental outcomes and a commitment to developing capabilities and skills of the workforce.

The United Kingdom has boosted funding to support new training to GBP 100 million aimed at upgrading the skill levels of the workforce in the sector. In addition the UK Economic Challenges Investment Fund amounting to GBP 50 million, will provide new opportunities for automobile employers looking to tap into academic expertise in improving business performance. The latter will represent an effort to help automobile firms create and develop new links along the value chain.

Box 4. Restructuring of General Motors

In June 2009, the Obama Administration released a fact sheet on the General Motors (GM) bankruptcy, which indicates GM will receive another USD 30.1 billion, on top of USD 20 billion in financing from the government it received previously. In return, the US government will receive approximately USD 8.8 billion in debt and preferred stock in the new GM and approximately 60% of the equity of the new GM, becoming the largest shareholder. Also, the Governments of Canada and Ontario will participate alongside the US government by lending USD 9.5 billion and will receive approximately USD 1.7 billion in debt and preferred stock, and approximately 12% of the equity of the new GM (www.whitehouse.gov).

A framework to achieve viability requires GM to rework its business plan, accelerate its operational restructuring and make far greater reductions in its outstanding liabilities. The US government, as a “reluctant shareholder” has established four basic principles on the government’s management of ownership interests in private firms:

- The government has no desire to own equity stakes in companies any longer than necessary, and will seek to dispose of its ownership interests as soon as feasible.
- In exceptional cases where the US government feels it is necessary to respond to a company’s request for substantial assistance, the government will reserve the right to set up-front conditions to protect taxpayers, promote financial stability and encourage growth.
- After any up-front conditions are in place, the government will protect the taxpayers’ investment by managing its ownership stake in a hands-off, commercial manner.
- As a common shareholder, the government will only vote on core governance issues, including the selection of a company’s board of directors and major corporate events or transactions.

It is expected that the effects of bankruptcy of the largest car producer will ripple across the entire global automobile industry as GM plans to sell or shut down four of the brands it sells in the United States – Pontiac, Hummer, Saturn and Saab. Pruning these brands, which accounted for 17% of the 2.9 million cars and light trucks GM sold in the United States. Last year, would leave the New GM with Chevrolet, Cadillac, Buick and GMC.

Magna International Inc., the Canadian auto-parts supplier, was selected as a possible partner for Opel, GM’s European division. Magna will examine changes to the Opel unit’s range of cars before completing a business plan by September 2009. Industry sources suggest Magna might use Opel to produce cars on contract for other brands. Magna is already in this business and this model is used in other industries such as semiconductors and mobile phones.

Not only the automobile industry itself, but many businesses that GM has supported will be severely affected by GM’s bankruptcy. For example, GM currently is the biggest spender on information technology in the United States, as measured by the percentage of revenue spent on IT services and software. It accounted for half the USD 9 billion that auto makers and their suppliers spent last year in this area, according to IDC.

In July 2009, GM emerged from bankruptcy production with the 4 leading brands Chevrolet, Cadillac, Buick and GMC remaining. The company will operate with 27 000 fewer US employees and 13 fewer US car plants.

Innovation is not only increasingly dependent on users, but also on the ability to mobilise and use the “creative potential” of users. If users (customers) are not willing to experiment, the new firms that may be needed to introduce the new technology will not have a sufficiently large market to become viable and there may be little pressure on established firms to adopt the new technology. Several countries have therefore focused on stimulating consumer demand in providing credit facilities and incentives to buy new cleaner, more fuel-efficient vehicles. Incentives have ranged from EUR 1 000 to EUR 5 000 per car and allow motorists to trade in their 10 year old, or older, car for a new one; incentives can be higher in the case of the purchase of a “green car” (Table 4).

While these measures can help to remove older, less-efficient, vehicles from the roads, they may also encourage greater material consumption, vehicle use, and ultimately increased emissions, thus offsetting the environmental benefits. Measures aimed at car-scrapping or support to the automobile industry also have the potential to generate inter- and intra-sectoral distortions, and can act as protectionist measures. Moreover, in boosting short-term demand, firms may avoid the necessary restructuring and reduction in capacity that is needed to foster a sound industrial base for the future.

Simply boosting short-term demand is therefore not sufficient to restructure the automobile industry and move to a more sustainable business model. Some restructuring and reduction of capacity will be needed, as will innovation to offer new choices for consumers and better meet consumer demands.

A number of governments have already introduced economic stimulus packages with components aimed at bolstering supply-side impetus for industrial renewal with the objective of significantly stepping up applied research and, in particular, development activities in the field of hydrogen and fuel cells. Spain for example is providing EUR 4 billion for the development and production of electric and hybrid cars. Germany has earmarked EUR 500 million support for research programmes in new energies in the automobile industry (with a focus on electro-mobility) and another EUR 500 million for the Hydrogen and Fuel Cell Technology Innovation Programme (launched in 2006). Likewise, the Japanese government is providing support for R&D investments in the latest automobile technologies, including battery development and power train applications for fuel efficient, low-emissions vehicles. In 2007 Japan announced that it would spend USD 1.72 billion over five years for next-generation power trains and fuels to cut petrol consumption and reduce carbon dioxide emissions. The Portuguese government and the Nissan Renault Alliance announced a partnership to promote “zero emission mobility” across Portugal. This involves, amongst others, raising people’s awareness of the advantages of electric vehicles and setting up a nationwide network of charging stations.

New solutions in this sector may also come from outside the existing set of global competitors, including from firms in developing countries that are already starting to offer cheap and fuel-efficient cars. Keeping markets open and enabling such competitors and new entrants to compete may lead to further restructuring in this industry and may also help the industry to better meet emerging consumer demands, *e.g.* for greener and more fuel-efficient cars.

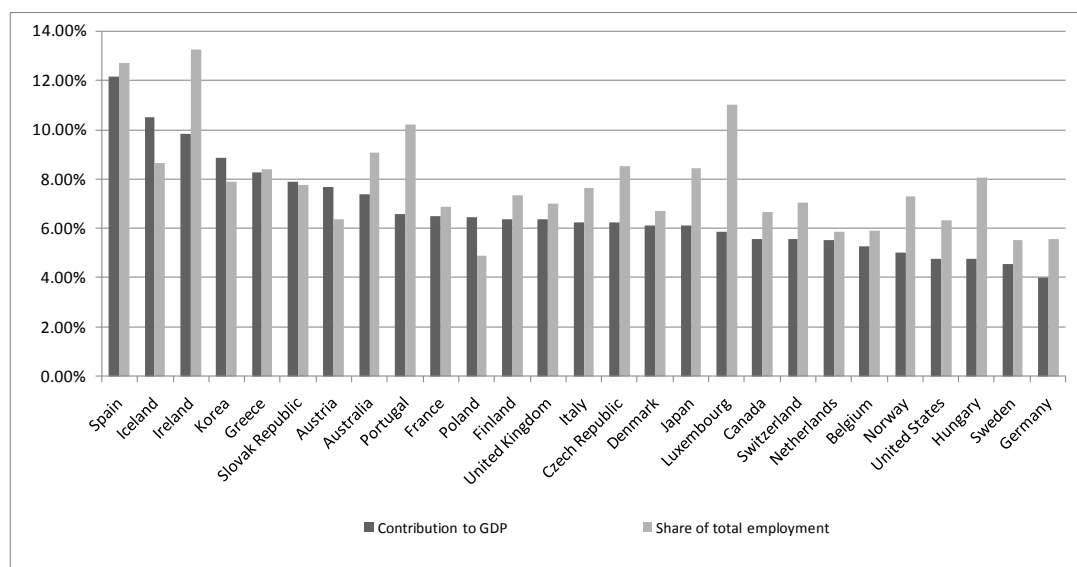
The construction industry

Industry overview

The construction industry is also labour and capital intensive, but is less globalised than the automobile industry. Prior to the crisis, the construction industry accounted on average for 7.7% of total employment in 2007, and in certain countries (e.g. Ireland or Spain) its share of total employment exceeded 10%. Until recently, this share was still rising.

The construction industry is also a significant contributor to GDP. At the level of the OECD as a whole it generates around 4-6% of GDP, but for some countries such as Spain, Ireland, Korea, Iceland and Greece its contribution to the gross domestic product exceeds 8% (Figure 11).

Figure 11. Contributions of the construction sector to employment and GDP
(percentage, 2007 or latest available year)



Source: OECD STAN Database.

According to Egan (1998) there are several key unique features that characterise the construction industry, including client leadership. This implies that in the construction industry, customers have significant bargaining power over suppliers in the value chain. This feature is a natural consequence of a low degree of concentration in the industry.

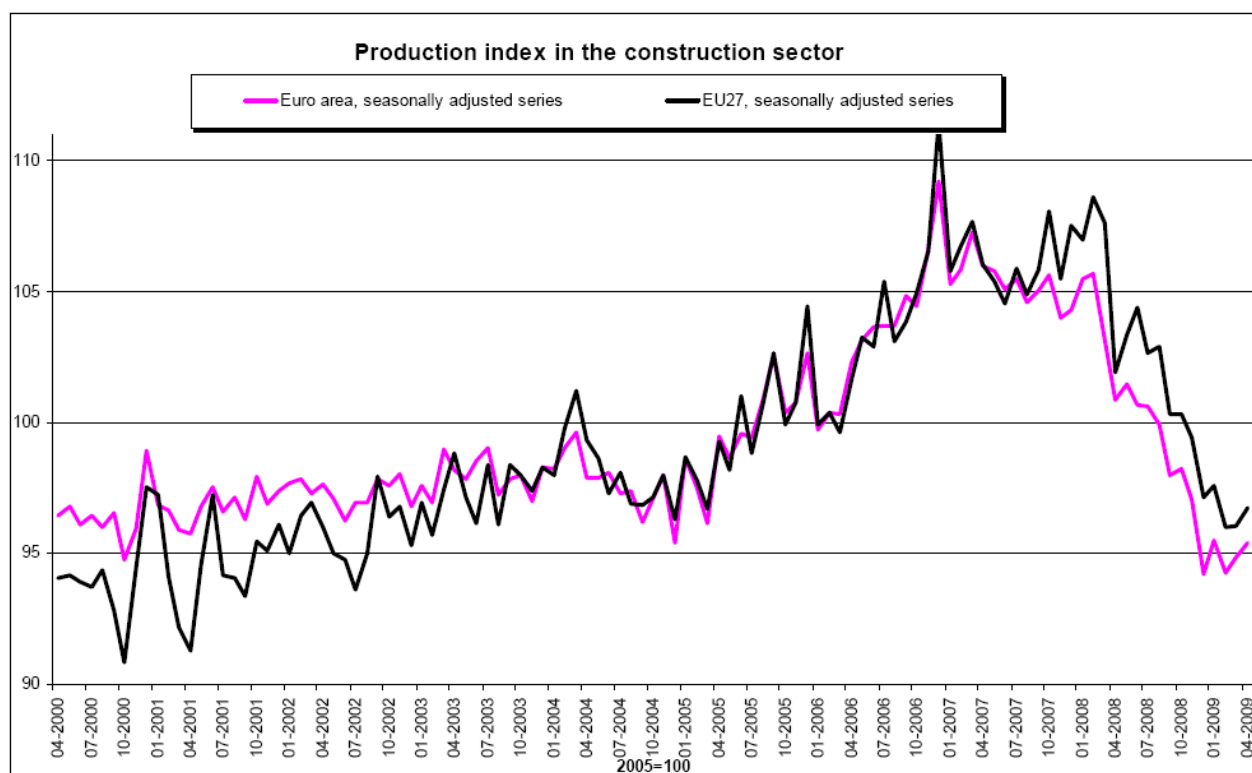
The economic impact of the construction industry goes far beyond its statistical representation. By supporting infrastructure, the construction sector contributes to improving the delivery of public services such as education, transport or healthcare, helps improve business productivity, and ultimately a country's standard of living.

The effect of the crisis on the construction industry

The construction industry was among the first industries to be hit by the financial crisis, as bubbles in the housing market in several countries burst in the second half of 2008. The global construction sector posted a very weak year in 2008, with aggregate output in the United States, Europe and Japan falling by 5%.⁹ In the BRIC countries, growth remained robust at more than 10% in Brazil, Russia and China but lower in India. On aggregate, world construction sector output is likely to have declined by 1.5% in 2008.

Construction output in the EU area fell sharply in the second half of 2008 and in the first quarter of 2009 (Figure 12). According to Eurostat, on a year-to-year basis, output in April 2009 dropped by 4.7% in the Euro area and by 5.1% in the EU. Among the Member States for which data are available for April 2009, construction output fell in six and rose in six. The most significant increases were registered in the Czech Republic (+5.2%), Spain (+3.2%) and Sweden (+2.9). The largest decreases were registered in Slovenia (-12.1%), Romania (-6.1%) and Slovakia (-3.1%).¹⁰

Figure 12. Production index for the Construction Sector, EU27 and Euro area



Source: Eurostat, news release 90/2009, 17 June 2009.

The European construction sector also posted a higher insolvency rate in 2008 than in 2007. Whereas in 2007, 17.6% of all bankrupt firms were in this sector, the figure in 2008 rose to 19.3%. The collapse of over-heated property markets in Spain and the United Kingdom accounted for a considerable share of these insolvencies.

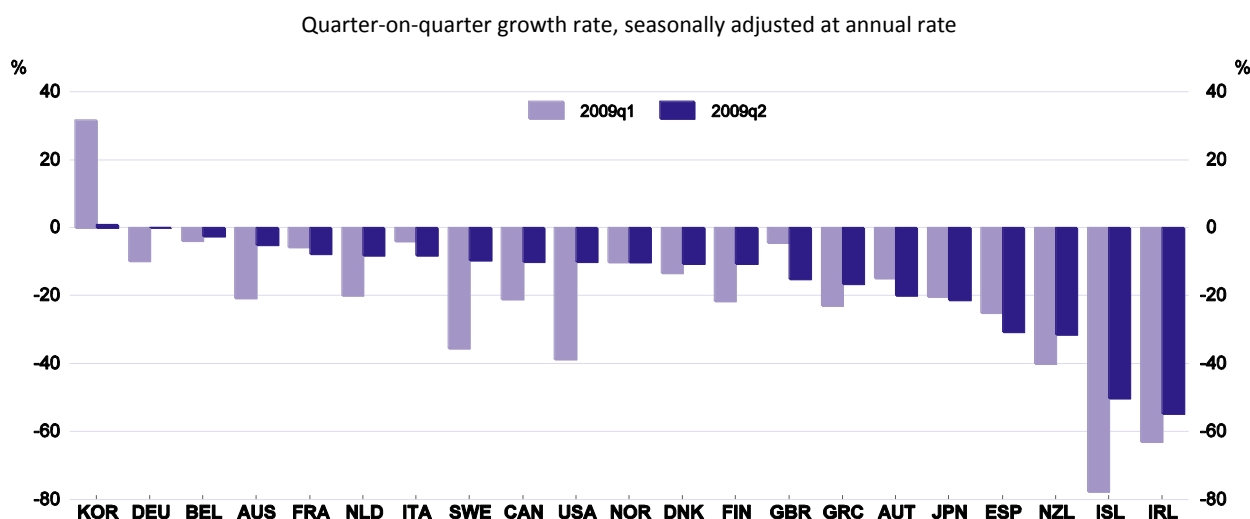
⁹. Oxford Economics' *International Industry Service*.

¹⁰. See Eurostat, news release 90/2009, 17 June 2009.

Recent data and projections from the OECD Economic Outlook suggest that housing investment is likely to fall by an annualised rate of more than 10% in about half of OECD countries in the first half of 2009, with particularly large declines in the United States, Japan, New Zealand, Ireland and Spain (Figure 13). The sharply falling number of residential permits is another indicator of the strong impact of the crisis on the construction sector (Figure 14). According to the OECD's Main Economic Indicators, during 2008 and into the first months of 2009, fewer residential permits were issued in almost all OECD countries. Most countries experienced reductions of more than 10%; but several countries experienced drops of more than 30%. Recent indicators for the United States show house sales and permits starting to flatten out, however, albeit at very low levels, and the stock of unsold houses continuing to fall significantly (OECD, 2009).

Emerging economies are also experiencing fast slowdowns in real estate markets, though there are wide differences across countries. In China, real estate investment growth came to a halt in the beginning of 2009, while other countries such as Russia are experiencing much sharper contractions as a result of the credit squeeze and declining economic activity.

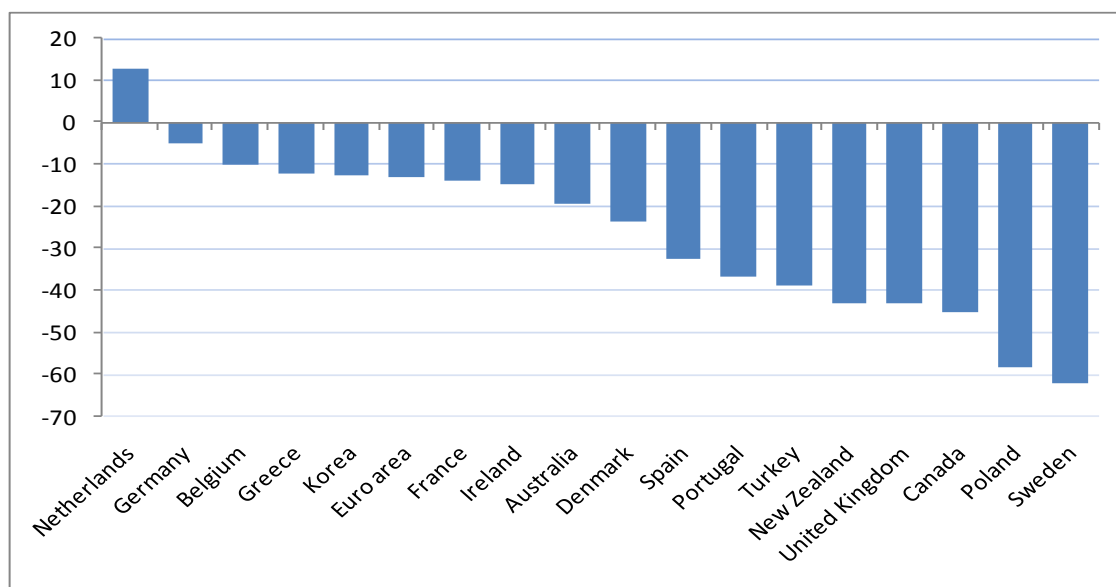
Figure 13. Housing investment is falling in almost all countries



Note: 2009q1 and 2009q2 are forecasted for most countries.

Source: OECD Economic Outlook 85 database.

The outlook for non-residential construction also remains weak. With the economic outlook still weak, and access to capital still difficult, business demand for industrial and commercial space is likely to continue to decline in many economies in the near term. As non-residential construction typically lags residential construction by several quarters, the housing market downturns observed around the world point to a contraction in private non-residential building activity through much of 2009. Government spending on infrastructure may at least partly buffer this effect, although the extent and timing of the infrastructure measures are still very uncertain. However, it is likely that the various measures will have positive effects, especially in 2010.

Figure 14. Change in residential permits, in per cent¹

¹ Monthly data mostly ending between December 2008 and April 2009; three-month average over the last year three-month average, seasonally adjusted.

Source: OECD, Main Economic Indicators database.

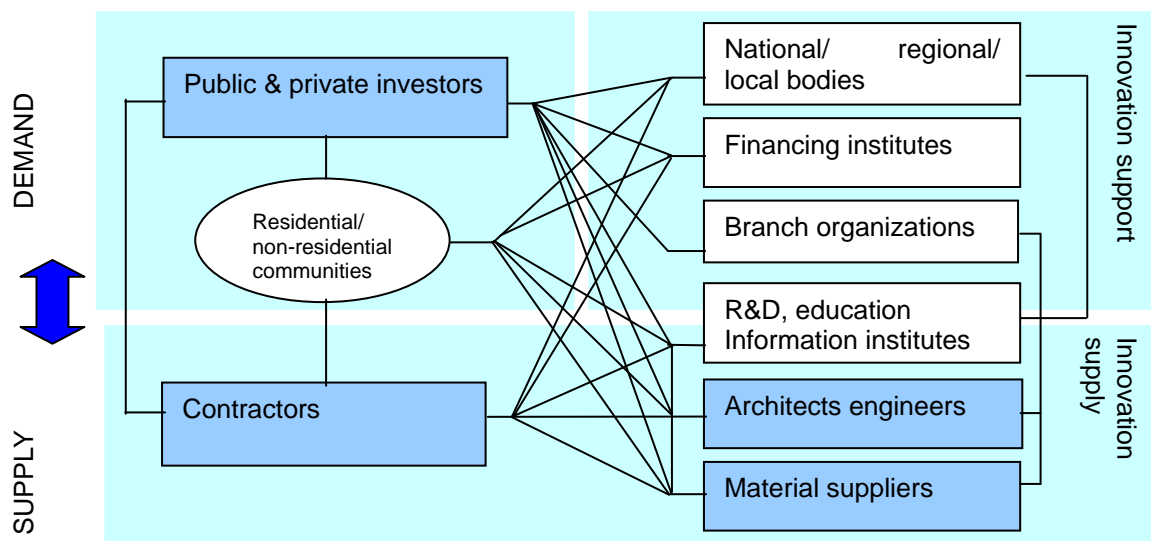
Global construction activity could therefore decline in 2009 as a result of weakness in private building activity. This, however, masks changes in the composition of activity. More specifically, much of the downturn is occurring in the residential investment segment, while activity in infrastructure could have positive growth. Construction activity in China, which should continue to increase strongly in 2009 and 2010, will provide the main positive impulse to this sector globally. In 2010, growth in the global construction sector could turn positive, supported by continued growth in infrastructure spending in emerging economies and a slower pace of contraction in private construction activity in the advanced economies as credit conditions continue to ease. However, some regions will continue to face slow growth in the construction sector also in 2010.

The prospects for industrial renewal in the construction industry

The construction industry is highly diverse and not easily captured by statements on its labour intensity or degree of innovation (Box 5). Innovation in the construction industry refers to the process of development, distribution and application of technologies – a new or improved product, process or service – and knowledge with the purpose to improve productivity and suit the customer's requirements (Egmond, 2007). Much of the innovation occurring in the sector is not well captured in traditional innovation indicators because it tends to be incremental and interactive. For example, much innovation occurs on site in the form of logistics, health and safety arrangements, people management or planning, reflecting that many construction projects are unique and require unique solutions.

Innovation in the industry involves a wide range of partners, notably supplying industries such as building materials, building equipment and machinery, architecture and design, and IT (Figure 15). Innovation outside the industry also helps induce innovation within the sector. In a survey of innovation in the UK construction industry,¹¹ innovations in ICT products, such as the Internet, IT developments, PDSs and mobile phones were considered to have the greatest impact on innovation in the sector.¹²

Figure 15. The innovation system for the Construction industry



Source: Van Egmond de Wilde de Ligny (2007).

Box 5. Innovation and the construction industry

The construction industry – while not widely perceived to be innovative – is by its very nature creative. This is particularly because of its focus on projects, which are rarely identical, making the construction industry a fertile environment for process innovation in practices and problem solving.

Firms in the construction industry would largely fall under what Keith Pavitt (1984) called the ‘supplier dominated’ category of firms, which is typical for traditional industries such as construction but also for clothing and furniture. Firms in these industries primarily innovate by acquiring machinery and equipment. Given its relatively large size in the economy, the construction industry acts as an important market for specialised suppliers of capital goods and equipment, who work very closely with their customers.

The sector is classified by the OECD *Frascati Manual* as a low-tech industry. This is reflected in its low R&D intensity and low number of persons employed in R&D. The sector also employs few highly skilled persons. Additionally, the construction sector has not experienced any statistically significant growth of labour productivity in recent years, which is surprising considering the many technological developments in this sector. This can potentially be explained in several ways. For example, it could be due to measurement problems which lead to underestimation of productivity growth, and the lack of standardisation in this industry may make productivity growth difficult to achieve.

11. See ‘Hidden Innovation’ a NESTA Report, 2008.

12. Source: CIOB Survey 2007.

As noted above, the crisis has severely affected growth in the construction industry. Some of the impacts of the crisis may also affect long-term growth factors and the rate of innovation in the sector, as outlined in Part 2 of the paper. For example, the poor prospects in the sector are likely to reduce the entry rate of innovative start-ups, reduce the prospects for young innovative firms, and may lead established firms to avoid more risky or innovative projects.

With many construction firms becoming insolvent, residential permits dropping, and total output reduced, spending on innovation, be it through investment in new machinery and equipment, R&D, training or other assets, is also likely to be reduced. Furthermore, the increase in insolvencies and unemployment may lead to a depreciation of talent, knowledge and expertise in the industry.

The crisis may also slow down knowledge transfer and diffusion in the industry. The structure of the industry (with many small firms) can be inhibitive to innovation diffusion and the uptake of new ideas across the industry, not least due to the high degree of subcontracting, limited management capacity, and limited human resources capacity. Due to its dependency on project-based partnerships, the industry generally suffers from a lack of integration along its value chain. This reduces the chances for cross-industry learning and the development of long-term strategic relationships that can foster new solutions.

At the same time, the crisis may provide an opportunity for governments to foster innovation in this sector. This could involve fostering demand for more energy efficient systems, eco-towns, and a more environmentally sustainable built environment, *e.g.* by the introduction of well-designed building regulations and standards, or in the context of government stimulus packages discussed below. The large public investments in infrastructure that are being rolled out in many OECD countries could also be used to leverage new forms of public-private partnerships in the industry that could bring new players closer to the heart of the industry.

For example, in Germany, the Federal Government and the KfW development bank have initiated a new refurbishment programme aimed at reducing CO₂ from residential buildings. The new regulations call for renovation/replacement of windows and heating systems combined with thermal insulation of the outer walls. From 2006 to 2009, a total of EUR 5.6 billion of federal funding is destined for the energy-conserving refurbishment of the housing sector, including EUR 200 million investments a year earmarked for the building refurbishment programme to reduce CO₂-emissions. The assistance consists of Federal Government loans of up to EUR 50 000 per housing unit combined with very low interest rates. To ensure good quality, all work must be carried out by professional companies. The scheme also has an economic objective which is to turn the German building and construction sector into a world leader in the CO₂ area and to strengthen Germany's position as a lead market in this area.¹³

Government responses and industrial renewal in the construction industry

Almost all countries are spending on infrastructure as part of their economic stimulus. The infrastructure projects generally focus on building and improving roads, bridges, railways, waterways, and airports, with much emphasis on investing in rural areas. In some countries, energy efficiency and renewable energy projects are included as part of the infrastructure investments. The proportion of stimulus measures being spent on infrastructure appears to be much higher in developing and emerging economies, while in developed economies most of the stimulus measures involve non-infrastructure spending, tax cuts, and income transfers (see Khatiwada, 2009).

¹³. See <http://www.bmvbs.de/en> cited in FORA's report "New Nature of Innovation" (forthcoming 2009).

In absolute terms, the largest infrastructure spending initiative is being taken by China, where more than half of the estimated 4 trillion Yuan package over two years may involve infrastructure spending, including speeding up rural infrastructure construction, accelerating the expansion of railways, airport construction, upgrading power grids, and post-earthquake reconstruction. Other emerging countries are spending almost USD 100 billion, most of which is infrastructure related.

In the United States, a total of approximately USD 189 billion in public investment to modernise and improve the nation's infrastructure will be allocated over the next two years. This includes the modernisation of roads, bridges, public transit, and waterways, broadband for under-served areas. There are also numerous spending measures on renewable energy and promotion of energy efficiency, such as upgrading the energy grid by constructing new power lines to transmit renewable energy from various sources throughout the country.

Many of the EU countries are together introducing about 1.5% of GDP in fiscal stimulus, with infrastructure forming part of most packages. Germany's EUR 82 billion package (over two years) allocates around 22% to infrastructure investment in schools and roads. Part of the French EUR 26 billion package involves major state infrastructure projects and investment in housing and construction. In the United Kingdom, 11% of the GBP 25.6 package (over two years) will be spent on motorway networks, new social housing, schools, and energy efficiency measures.

According to information from OECD countries as well as many non-OECD economies, the total amount of public investment (at the time of writing) related to infrastructure may total around USD 944 billion over the next two years as part of the stimulus packages announced.¹⁴ Around 60% of this spending would take place in emerging and developing economies, and the remainder in advanced countries. Although most countries announce that the spending occurs over two years, history shows that the delays in implementing infrastructure projects can be very long. Moreover, estimates of the expenditure amounts and the shares allocated across stimulus programmes are evolving, and may turn out to be different from those that have so far been announced.

^{14.} There are numerous uncertainties surrounding such figures. First, most plans are awaiting political ratification and implementation, and thus their details are still changing. Second, initial plans are often followed up by additional measures, causing frequent changes in the total amounts being spent. Third, the figures quantifying the sizes are not for identical time periods (most cover 2009-2010, but others cover only 2009 or three to four year periods) or are simply unknown. Moreover, the figures do not necessarily imply new spending measures, as in some cases the measures represent a carrying forward of planned government expenditure.

In addition many of the newly introduced schemes are aimed at boosting investment in eco-friendly infrastructure and the building environment (Table 5). For example, the United States is focusing on modernising federal and other public infrastructure with investments that lead to long-term energy costs savings. France's objective is to reduce energy consumption of existing buildings by 38% between now and 2020; the government has decided to provide green zero-interest loans to construct and renovate energy-efficient buildings. The EU Member states have planned through the Cohesion Policy to invest EUR 4.8 billion in renewable energies and EUR 4.2 billion in energy efficiency and energy management measures. Korea will also invest in construction of new "green" housing and developing technology for energy efficient houses and buildings and schools. This scheme includes funding opportunities for R&D activities (*i.e.* potentially renewal opportunities).

Table 5. Examples of energy efficiency investments

France	EUR 100 million EUR 200 million	Energy efficiency in homes Energy efficiency in public buildings
Korea	KRW 9 trillion	New green housing and green technology for buildings
Portugal	EUR 100 million	Energy efficiency in public buildings
United States	USD 16.5 billion	Investments in energy costs savings

It remains difficult however to assess the impact of these spending packages on demand or renewal in the sector, and how much of it will instead strengthen existing industrial structures. An important question in this respect is to what extent the governments' stimulus packages are aimed at strengthening innovation and industrial renewal.

One key aspect is the degree to which the stimulus measures support innovation. While the bulk of government packages revolve around stimulating demand, supply-side factors, such as R&D activities and training, and to some extent seed capital, do appear in various stimulus packages, although not necessarily aimed specifically at the construction sector. Many of the stimulus packages include investments on smart infrastructure, however, such as broadband, "intelligent" transport systems, smart buildings and electrical grids. The United States, for example, is providing USD 11 billion for research and development, pilot projects, and federal matching funds for the Smart Grid Investment Program.

It is also important that packages stimulating construction investments (Table 6), *e.g.* in buildings and transport infrastructure, will not lock-in inefficient or polluting energy technologies, or dirty modes of production and consumption, but instead promote clean alternatives. In many cases this implies that packages should not only consider the construction sector itself, but also key suppliers of such technologies and solutions.

Improvements in infrastructure included in the stimulus packages are concentrated on roads, railways, airports, schools and universities, hospitals, and many contain "sustainability elements". For example, the United States has dedicated USD 27.5 billion for highway construction with the aim of creating jobs in the short term while improving the economy in the long term. A further USD 17.7 billion is set aside for transit and rail to reduce traffic congestion and petrol consumption. Norway will be investing in railways, roads and harbours and a number of construction projects amounting to NOK 2.8 billion. Italy will, in addition to EUR 960 million investments in rail, set aside EUR 480 million for local public transport for 2009-2011. Korea will spend KRW 11 trillion on increased investment in green transport. This includes the launching of high-speed trains ahead of schedule and improvement in urban transit networks.

Table 6. Examples of incentives for construction investment in selected countries

	rail	roads	Schools/ universities	housing	Fiscal measures
Australia (AUD)	1.2 billion	711 million	1.6 billion universities	6.6 billion	20% cut in tax for 1.3 million SMEs; 1.5 billion to first time home buyers
Belgium (EUR)					Reduction in TVA from 21% to 6% for new social housing and new buildings Reduction in TVA from 12% to 6% for public buildings
Canada (CAD)	480 million	130 million	2 billion post secondary	4 billion rehabilitation projects	2 billion direct low cost loans to municipalities to invest in housing
France (EUR)	300 million	400 million	731 million universities/ research centres	340 million social housing	50 million to first time home buyers; zero per cent loans for energy efficient housing
Italy (EUR)	960 million				55% income tax deduction for renovation of buildings in 2009
Norway (NOK)	1.3 billion		470 million universities/colleges		
Sweden					Tax deductions for house owners who take energy efficiency measures
United States (USD)	17.7 billion	27.5 billion (transit & rail)	(1)	9.6 billion	2.25 billion low income housing tax credits

(1) There is no amount specified in the bill for school construction, but the measure does allow local school districts to choose to finance facility modernisations, and non-construction programmes, through a broad-based education set-aside in the bill's State Fiscal Stabilization program.

Source: OECD, based on responses to questionnaires sent to member countries.

Other schemes are specifically targeted at low-income households. France will build or buy an additional 100 000 units in social housing. France also extended its "Pass-foncier" to provide financial help to lower wage households to buy houses. Other countries have sought to stimulate the sector by providing investment to help first time home buyers purchase a home. This is the case for example in Australia which is investing USD 1.5 billion for first time home buyers between 2008 and 2010. Other measures include reductions in VAT for new social housing, and the construction of public buildings and fiscal deductions for energy related work. Several governments have put in place 0% loans for the purchase or renovation of energy efficient houses. Many governments have also announced investments in renovation of public buildings, and energy-efficiency and renewable energy measures in housing.

The question is to what extent these measures will help foster innovation and renewal in the sector or whether they will simply prop up the sector by fostering demand. Where government policies and procurement are creating new demand, *e.g.* for more energy-efficient buildings and smart roads, they may help foster innovation in the sector. For example, demand for the use of new technologies in the construction of new buildings or roads may help create new sourcing partnerships between contractors and solution providers.

Complementing the stimulus packages with additional measures that strengthen the potential for innovation in the construction sector may help. For instance, many small firms in the sector lack the time, expertise and resources needed to identify sources of knowledge and partners to help them benefit from an increased demand for new and modified products and services. Knowledge brokering programmes and schemes that have been established in other sectors might prove to be equally useful in this sector.

Impacts on supplying industries

The automobile and construction sectors are economically linked with other industrial sectors. The ratio of total intermediary input and the gross total output varies in most large economies¹⁵ between 75% to 95% for the automobile industry and 50%-80% for the construction industry.

Apart from a high volume of within-industry exchange, the intermediary supply seems to be the strongest with sectors such as the steel and the machinery production industries (see Tables A1 and A2 in the annex). The steel industry supplies between 4% and 16% of total intermediary input for the automobile industry and 2% and 12% for the construction industry. The machinery industry accounts for 2% to 10% of intermediate supply to the automobile industry and 1.5% to 4% of intermediate supply to the construction industry.

Both the construction and automotive industries are also significant intermediary suppliers to other industries (see Tables A1 and A2 in the annex). In addition, a large share of the output of the automotive industry (up to 70%) is exported.

The strong interconnections between these industries and other sectors implies that the slowdown in the automobile and construction industries will in turn spill over into other sectors, including the steel and machinery industries.

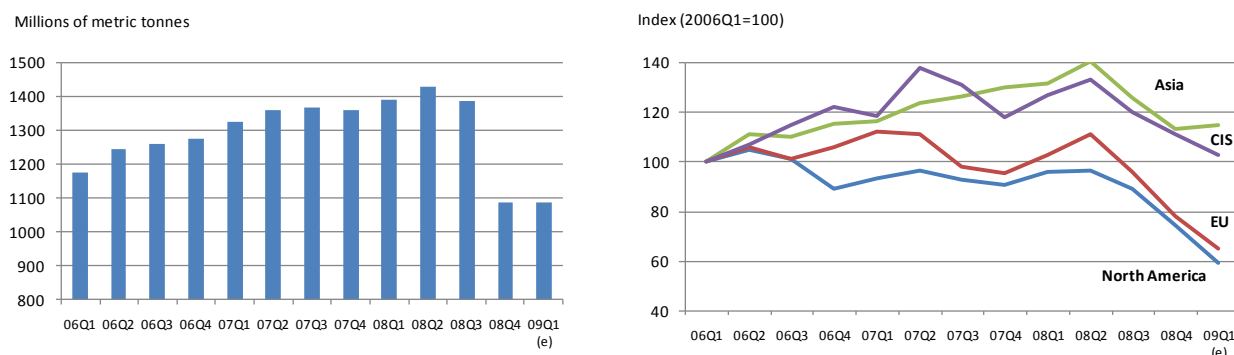
The steel industry

The downturn in the steel market began in the summer of 2008 and gained momentum in the second half of 2008, driven by further deterioration in world economic prospects (Figure 16). Steel demand, production, and prices have plummeted, major layoffs have been announced and demand for key raw materials such as iron ore, ferrous scrap, and coal has weakened.

^{15.} Source: OECD Input-Output Database. Data for France, Germany, Japan, United Kingdom, United States, Brazil and China; 2006 or latest available.

Figure 16. Global and regional apparent steel demand for finished steel, 2006-early 2009

Million metric tonnes (world demand) and index values (regional demand)



Source: OECD Steel Committee; estimates based on data from WSD, CRU, and EUROFER.

The automobile and construction sectors were amongst the biggest consumers of world steel in 2007; around 15% and 50% respectively (Worldsteel Association, 2008). Any demand change from those industries will immediately affect steel production and consumption. According to the latest data by World Steel Dynamics, steel consumption dropped significantly in 2008, making a record decline rate in 16 years. It is foreseen that world steel production will decrease even more in 2009.

The machinery industry

The machinery production industry is affected too. This industry includes a whole range of machinery producers, mostly operating in a highly competitive mode and including many small and medium sized enterprises. As noted before, this sector is relatively heterogeneous and groups suppliers of various types of machinery such as agricultural, construction and earthmoving machinery, and machinery for other industries, for example the oil and gas industry, automobile industry etc. Certain parts of this sector are also severely affected by the crisis through the reduced demand from the automobile and construction industries.

The adverse impact of the crisis on machinery producers is reflected in the available datasets. In 2008, exports of machinery reported a year to year decline, closing at between a 30% and 45% drop. The situation seems to be particularly dramatic in industries supplying machinery for the construction industry such as earthmoving machinery and components. In 2008, there was a general downturn in the wider global market which brought about a 10% drop in sales, with a further 15% fall expected in 2009. Sales in Europe fell last year by 27.5%. According to estimates, the downturn is expected to persist through 2009, with sales in sharp decline (Comamoter, 2009).

Driving industrial restructuring and renewal: what role for policy?

A new role for government in driving structural change?

Government stimulus packages aimed at combating the global economic crisis not only contain measures to stimulate demand in the short term but they also foster medium-and long-term growth. In addition to measures aimed at saving banks and the financial system, priority is also being given to long-term growth and economic renewal through investment in research and development, infrastructure, education, the greening of the economy, and support to innovation and SMEs. In addition, there are long-term measures that governments continue to pursue but which are not necessarily contained in the packages.

As governments take on a larger role in many OECD economies, sometimes including the nationalisation of private firms, considerable discussion is emerging as to the appropriate role of government in 21st century economies. In many cases, such as support for the financial sector, government's role is typically considered to be only temporary, and policy interventions typically aim at a relatively quick exit when the private sector would be ready to return as the major player.

One important policy question concerns the appropriate role of government in fostering structural change and industrial renewal. In recent years, a discussion has re-emerged about the need and desirability of government action, based on the success of some countries in strengthening long-term economic growth and improving their comparative advantage. Based on insights from the recent literature of 'institutional innovation', some economists, such as Rodrik (2004) have argued for new approaches. Policies aimed at improving the functioning of labour, products and financial markets are essential but may not always prove sufficient to successfully move countries up the value chain. Indeed, it is commonly recognised that important market and systemic failures may reduce the incentives for private investments in innovation and industrial renewal, *e.g.*:

- Knowledge spillovers – when competitors and other innovators are able to use and benefit from new knowledge created by a firm, the benefits to society from investments in innovation can exceed the private returns. At the same time, because the innovators cannot appropriate all the benefits of their investment, investment will be less than socially optimal.
- Information asymmetry – the outcomes of innovation efforts are highly uncertain, especially in their early stages, and can be very complex, which may make it difficult for firms to raise external funding for investments in innovation.
- Rigidities and systemic failures in the functioning of economies and innovation systems can also prevent the private sector on its own from making the transition to higher value added activities and may lead to economies being “locked in” a situation of low growth. This can be due to lack of awareness, or structural and cultural barriers, and sometimes due to lack of capacity. This can be particularly important for industries where interdisciplinary solutions are needed, or where restructuring and the development of new business models are underway.

These factors have typically served as the rationale for government actions. However, in contrast to previous approaches to industrial renewal where government intervention was often heavy-handed, new approaches stress the strategic and flexible co-operation between the government and the private sector. While private entrepreneurship and market forces are still considered the main drivers of growth, governments are considered to have a strategic and coordinating role that goes beyond ensuring property rights, contract enforcement and the basic functions of a modern government. The resulting partnership between the public and private sector is aimed at eliciting and understanding business opportunities and constraints, and identifying areas where policy intervention may be required, *e.g.* policies to foster innovation and entrepreneurship. An example of a statement on this changing perspective on government's role is set out in Box 6.

Box 6: New approaches to industrial renewal

In a 2008 lecture to The Royal Society for the encouragement of Arts, Manufactures and Commerce, the UK Secretary of State for Business, Enterprise & Regulatory Reform, Lord Mandelson, described policies for "industrial activism", based on five core principles:

- First, industrial activism does not mean propping up failed companies or running industries, nor protection of industry from international competition, as competition is believed to be in the long-term interest.
- Second, industrial activism means being pragmatic about the ability of markets to enable companies and people to succeed in a rapidly changing global economy. Policy should be activist in the sense that it recognises that government can and must complement market dynamics to get the best outcomes for our society and economy.
- Third, industrial activism is shaped not just by what is conventionally labelled industrial policy but by all government policies – regulation, planning policy, migration policy, transport policy and a range of others – as well as the way government spends money and encourages innovation and entrepreneurship. The central point about industrial policy is how successfully it aligns all these relevant policies to target and deliver industrial outcomes.
- Fourth, industrial activism means looking strategically at each sector in the economy, not in order to apply top-down political patronage to companies in these sectors but to assess how horizontal policy can secure maximum benefits across all sectors and reinforce particular strengths.
- Fifth, industrial activism means engaging globally to shape the institutions and policies that manage globalisation and global regulation and making sure companies are exploiting open markets.

This new approach to industrial policy is reflected in a recent UK Government strategy document (*New Industry New Jobs*) which stated that "We need to start seeing industrial policy and our competitive strengths in a wider, strategic way. What Government does – or does not do – when it taxes, regulates, buys goods and services or acts in any of a range of ways shapes the conditions in which British businesses and their employees develop and capitalise on their competitive advantages. This means making Britain's economic and industrial renewal the remit not just of the Department for Business, but of all Government departments." (HM Treasury, April 2009).

A more active government role in supporting and fostering change in the economy needs to be carefully considered. Past experiences show that top-down policies and old-style industrial policies do not work. However, there are many other actions that governments can take to foster structural change and improve economic and social outcomes, *e.g.* in support of a green economy (see Box 7).

One area of action involves public spending. Governments, often in close consultation with stakeholders and in the context of the democratic process, set spending priorities that influence the future orientation of OECD economies. Supporting research, education, infrastructure and other categories of government spending involves making choices on where to spend and allocating priorities. In many countries, priority setting is increasingly linked to a combination of top-down and bottom-up processes that seek to understand the future orientation of societies, *e.g.* roadmaps, scenarios and foresight studies.

Policies to revitalise the economic structure of OECD countries cannot just be about the fostering of new industries. They will also need to enable (and sometimes encourage) the decline and restructuring of dying industries and enable the reallocation of resources from old industries to new industries. Previous OECD work has pointed to some of the main considerations in driving such structural change (OECD, 2005).

First, competitive and open product markets are key to structural change as they generate the market signals that indicate changes in global demand. For industrial sectors, openness to international trade is particularly important. The stronger competition associated with international trade can reduce costs and prices, increase efficiency and innovation, broaden the range of products being offered and can reduce the fragmentation of markets.

Second, labour market institutions play an important role in helping countries adjust to structural change. Unemployment and related benefits should promote job-search, rather than providing passive support and thus slowing down adjustment to structural change. Effective re-employment services and schemes that make work pay can make it easier for displaced workers to find new jobs in growing parts of the economy. A wage setting system capable of providing appropriate price signals also helps facilitate structural adjustment. Flexibility in relative wages is also important, as it provides incentives for workers to react to structural changes that require them to change industry, to move to another region and to invest in training.

Box 7: Fostering a green economy

One key example where governments are taking on a more active role to encourage renewal and restructuring concerns the shift towards a “green” economy. Policies in this area are typically founded on the introduction of economic instruments that improve the long-term incentives for firms to invest in green growth and low-carbon activities. This includes pricing the bad (*e.g.* carbon emissions), thus providing incentives to private firms to invest in green innovation. This also allows firms to make their own investment and innovation decisions that can help reduce carbon emissions without unnecessarily restricting their actions. If embedded in a long-term policy framework, preferably at the international level, it also gives firms the necessary stability to make the long-term strategic and investment decisions that are required to move to a low-carbon economy.

Such policies are typically complemented with other actions to drive the innovation and resulting transition of OECD economies that is needed to move to a low-carbon economy. For example, empirical work at the OECD has shown that in the past increases in fossil fuel prices, targeted R&D expenditures, as well as policy measures such as feed-in tariffs, investment grants, and obligations have been a significant inducement to innovation with respect to renewable energy technologies (OECD, 2008).

Additional measures that governments can take are directly related to the role of the public sector in OECD economies. Such actions refer to, for example: *a)* investment in green public infrastructure, *e.g.* public transport networks, carbon-neutral public buildings, smart ICT networks); *b)* investment in capabilities that can underpin green growth, *e.g.* research and education; *c)* well-designed and flexible regulations to drive change in certain areas, *e.g.* building codes and appliance standards; *d)* measures facilitating sustainable production to encourage the private sector to better benchmark, analyse and improve their environmental performance.

Third, the shift towards new industrial sectors may also require changes to human resource and educational policies, as new firms may require skills that are currently in short supply, *e.g.* those required for specific sectors, such as the environmental sector, or for specific needs, such as ICT or innovation. Having a good supply of qualified personnel is important, since many sectors require highly skilled workers, but education policies need to be supplemented with actions and co-financing by firms, workers and governments to foster life-long learning.

As governments take on additional roles in OECD economies, policy also needs to take steps to avoid government failure and ensure that government decisions are effective. This involves, amongst others, careful monitoring and evaluating of policies to ensure that they are effective and deliver value for money.

Policy and the future structure of OECD economies

The appropriate future policies for OECD countries may also depend on how the structure of economies will evolve in the aftermath of the economic crisis. The impact of the crisis on the long-term evolution of the structure of OECD economies and the relative role of the manufacturing and services sectors, as well as the future sources of competitive advantage are obviously difficult to predict. A number of factors may need to be considered:

- First, as firms in both manufacturing and services sectors seek to cut costs in response to the crisis and focus on core strengths, activities that are no longer considered viable are likely to be cut back, terminated or outsourced. The decision on what to cut back on and what to focus on will depend on the situation and business strategy of each firm. However, historical experience shows that as productivity and incomes increase, OECD countries have tended to focus on activities that are highly productive and create high value added, in particular in sectors that are

exposed to international competition. Increasingly, such activities are heavily based on investments in intangible assets.¹⁶ Activities that rely primarily on low-cost labour are the most likely to be cut back further, in particular where they are exposed to international competition from low-cost producers.

- Second, depending on the speed and intensity of (particularly price) incentives to move towards a low-carbon economy, the structure of OECD economies may evolve. For example, activities that are not yet commercially viable, but would become viable in the context of appropriate price incentives, *e.g.* alternative energy or electric cars, are likely to gain in importance. Conversely, activities that are a large source of carbon emissions may become less viable. Such activities may be cut back or may evolve as new technologies or business models enable these firms to cut back on emissions.
- Third, the speed and nature of such structural shifts will also depend on international conditions and frameworks. Open markets for trade and foreign direct investment are important drivers for structural shifts and encourage countries to specialise in their own areas of strength. The structural shifts in response to climate change also depend on international frameworks. If all countries participate in the shift to a low-carbon economy, and appropriate incentives are put in place for firms world-wide, the risk of countries simply transferring their most “polluting” activities to other countries can be significantly diminished.
- Fourth, changing demand in OECD countries will continue to have an important impact on the structure of OECD economies. The continued ageing of populations is but one of the many shifts that will influence future consumer and business demand for products and services. The growing involvement of users and consumers in the innovation process and the growing range of innovations that are derived from and build on the Internet may also have far-reaching implications on the types of goods and services that are demanded, on the way they are delivered, and on the various actors that supply them.
- Finally, government actions, as discussed above, play a role in determining the future structure and orientation of OECD economies.

In sum, while the economic crisis is having important repercussions on OECD countries and globally, in terms of GDP, employment and trade flows, it also offers an opportunity to start the transition to a stronger, cleaner and fairer world economy. These opportunities exist even in industries most affected by the crisis, such as the automobile and construction industry. Government policy, both in the context of short-term stimulus packages, and in the context of longer-term actions, plays an important role in enabling and fostering the industrial restructuring and renewal that is needed.

^{16.} A recent study for the United Kingdom found that investment by the manufacturing sector in intangible assets amounted to GBP 32 billion in 2004, compared with GBP 14 billion in tangible assets (BERR/DIUS, 2008).

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ANNEX

Table A1: Automotive industry

country	France	Germany	Japan	United Kingdom	United States	Brazil	China
Input							
top 5 intermediary suppliers (% of total)	Motor vehicles, trailers & semi-trailers (28%) Wholesale & retail trade; repairs (8%) Fabricated metal products, except machinery & equipment (8%) Iron & steel (8%) Rubber & plastics products (7%)	Motor vehicles, trailers & semi-trailers (43%) Fabricated metal products, except machinery & equipment (7%) Other Business Activities (6%) Iron & steel 96%) Rubber & plastics products (5%)	Motor vehicles, trailers & semi-trailers (60%) Wholesale & retail trade; repairs (5%) Research & development (5%) Rubber & plastics products (4%) Electrical machinery & apparatus, nec (4%)	Motor vehicles, trailers & semi-trailers (26%) Wholesale & retail trade; repairs (15%) Fabricated metal products, except machinery & equipment (8%) Iron & steel (7.5%) Rubber & plastics products (7%)	Motor vehicles, trailers & semi-trailers (37%) Iron & steel (9%) Wholesale & retail trade; repairs (9%) Fabricated metal products, except machinery & equipment (6%) Machinery & equipment, nec (5%)	Motor vehicles, trailers & semi-trailers (29%) Iron & steel (10%) Wholesale & retail trade; repairs (7.5%) Rubber & plastics products (7%) Land transport; transport via pipelines (3%)	Motor vehicles, trailers & semi-trailers (36%) Iron & steel (16%) Machinery & equipment, nec (10%) Chemicals excluding pharmaceuticals (9%) Wholesale & retail trade; repairs (4%)
Output							
Ratio of household cons. as a share of total intermediate consumption	0.2	0.5	0.2	1.7	1.0	0.5	0.1
top 3 intermediary demanders	Motor vehicles, trailers & semi-trailers Wholesale & retail trade; repairs Other Business Activities	Motor vehicles, trailers & semi-trailers Wholesale & retail trade; repairs Machinery & equipment, nec	Wholesale & retail trade; repairs Railroad equipment & transport equip nec. Public admin. & defence; compulsory social security	Motor vehicles, trailers & semi-trailers Wholesale & retail trade; repairs Land transport; transport via pipelines	Motor vehicles, trailers & semi-trailers Wholesale & retail trade; repairs Other community, social & personal services	Motor vehicles, trailers & semi-trailers 33 Land transport; transport via pipelines Wholesale & retail trade; repairs	Motor vehicles, trailers & semi-trailers Land transport; transport via pipelines Wholesale & retail trade; repairs
Exports	70%	57%	28%	42%	15%	25%	10%

Source: OECD Input-output database.

Table A2: Construction industry

Country	France	Germany	Japan	United Kingdom	United States	Brazil	China
Input							
top 5 intermediary suppliers (% of total)							
	Construction (21%)	Other non-metallic mineral products (13%)	Fabricated metal products, except machinery & equipment (18%)	Construction (45%)	Wholesale & retail trade; repairs (18%)	Other non-metallic mineral products (10%)	Rubber & plastics products (25%)
	Other Business Activities (12%)	Real estate activities (10%)	Wholesale & retail trade; repairs (14%)	Other Business Activities (7%)	Research & development (10%)	Wholesale & retail trade; repairs (5%)	Iron & steel (13%)
	Other non-metallic mineral products (10%)	Electrical machinery & apparatus, nec (8.5%)	Other non-metallic mineral products (11%)	Other non-metallic mineral products (6%)	Fabricated metal products, except machinery & equipment (9%)	Rubber & plastics products (2%)	Agriculture, hunting, forestry and fishing (10%)
	Wholesale & retail trade; repairs (9%)	Wholesale & retail trade; repairs (8.5%)	Other Business Activities (7%)	Wholesale & retail trade; repairs (5%)	Other non-metallic mineral products (8%)	Chemicals excluding pharmaceuticals (2%)	Fabricated metal products, except machinery & equipment (7%)
	Fabricated metal products, except machinery & equipment (6%)	Fabricated metal products, except machinery & equipment (7%)	Wood and products of wood and cork (7%)	Finance & insurance (5%)	Wood and products of wood and cork (7%)	Fabricated metal products, except machinery & equipment (2%)	Land transport; transport via pipelines (5%)
Output							
Ratio of household cons. as a share of total intermediate consumption	0.1	0.1	n.a.	0.1	n.a.	0.0	n.a.
top 3 intermediary demands							
	Construction	Real estate activities	Real estate activities	Construction	Public admin. & defence; compulsory social security	Public admin. & defence; compulsory social security	Education
	Real estate activities	Construction	Production, collection and distribution of electricity	Real estate activities	Real estate activities	Education	Health & social work
	Public admin. & defence; compulsory social security	Public admin. & defence; compulsory social security	Public admin. & defence; compulsory social security	Public admin. & defence; compulsory social security	Wholesale & retail trade; repairs	Real estate activities	Real estate activities

Source: OECD Input-output database.