Chapter 1

Near-term outlook for the economy, trade and transport

This chapter reviews recent trends in economic development, trade and transport. It establishes the link between growth and transport demand based on historical data on GDP, trade, and global transport. Together with near-term economic projections, this chapter outlines the expected freight and passenger transport in the near-term. It discusses the shift of economic mass to emerging economies and provides evidence of some rebalancing of trade and transport flows. The chapter also reviews trends in car use in high-income economies and highlights rising uncertainty over future mobility choices.

Economic growth and transport

Historically, there is a close statistical correlation between the growth of Gross Domestic Product (GDP) and growth in transport, both passenger and freight (Bannister and Stead, 2002). Growth in global air-passenger-kilometres is generally linked with economic growth in both the long-term and in relation to the business cycle (Button, 2008; IATA, 2008) and this is true for most other transport sectors. Demand for commuting is somewhat less sensitive to short-term fluctuations in GDP and demand for public transport is therefore somewhat less elastic than other modes. Growth in per-capita income levels also has a positive effect on the ownership and use of private vehicles, tending to increase reliance on private vehicles to meet mobility demand. The elasticity of private ownership with respect to per capita GDP follows an S-shaped curve, with ownership rising slowly with income while income remains low, accelerating while income goes through medium levels, and slowing down again as incomes reach high levels (Dargay et al., 2007).

The relationship between freight transport and economic activity has been studied extensively in the past and it has been fairly well established that surface freight (road and rail) volumes correlate strongly with GDP (Garcia et al., 2008; Meersman and Van de Voorde, 2005; Bennathan et al., 1992). Freight transport is directly tied to the supply chain (both finished and intermediate goods) and, as a consequence, transport of goods reflects growth in sales or activity in the manufacturing sector.

However, in the highest income economies there are signs that at least some forms of mobility, particularly car use, are now growing less quickly than GDP. Over the past 10 to 15 years, the growth of passenger vehicle travel volumes has decelerated in several high-income economies and in some growth has stopped or turned negative. Slowing population growth, population ageing and increasing urbanisation contribute to the change in passenger vehicle use in several countries. There is evidence that car use growth has been reduced through policy interventions, particularly in urban areas and sometimes at the national level.

Recent studies also suggest that the relationship between GDP and tonne-kilometres may not be as enduring as supposed, resulting, for example, in revisions of road traffic forecasts in some countries (McKinnon, 2007; Tapio, 2005). We also find evidence that the relation between GDP and freight tonne-kilometres successively decreases as per capita incomes grow (see chapter *Surface transport demand in the long-run* for more discussion and evidence). There are several reasons for this. A reduction in the transport intensity of GDP can be a result of a dematerialisation of production. Growing service sector shares in advanced economies or increasing production and trade of lighter weight goods like electronic devices reduces actual tonnages shipped.

Because GDP and freight show similar patterns of growth, this does not necessarily imply causality. However, transport contributes to economic growth and to welfare by facilitating access to labour and output markets and to welfare-enhancing activities in

general. There is ample evidence that transport activity rises with economic development, and that this is both because transport enables development and development leads to more demand for movement of people and goods. Global economic development is supported by fast, smooth and cheap transport as it facilitates reaping gains from specialisation and from economies of scale while maintaining good connections with markets.

The growth impact of transport infrastructure has been the subject of a body of literature over the past decades (for a summary of empirical literature, see Kamps, 2005; Jong-A-Pin and de Haan, 2008; Crafts, 2009). Since early findings of large growth effects from spending on public infrastructure, e.g. in the seminal study by Aschauer (1989), new and more sophisticated econometric work has produced a wide range of results, including findings of no growth effects at all. A recent work by Melo et al. (2013) concludes that output effects from infrastructure investment are highly context-specific, and not every investment should be expected to engender strong output growth. One possible explanation for the absence of robust findings on growth effects from transport spending in aggregate data is that the growth effects are too diffuse over time and space to be traceable in such data. Alternatively, it may be the case that in fact there is no strong effect on average. Nevertheless, there is some evidence that the productivity of public capital has been declining in advanced economies. This is intuitively logical as the more complete the network becomes, the lower the average impact of another segment. However, it is important to point out that even if the average impact is low, individual projects may have a high economic rate of return and be worth pursuing also in advanced economies.

Transport externalities have a negative impact on the relationship between transport activity and growth as they impose additional costs. Congestion and unreliability impose real costs on individual users and have significant impacts on productivity and growth through, for example, increased inventory holdings and travel time losses (CEMT, 2007; ITF, 2010). The economic cost of air pollution from road transport in OECD countries is estimated at close to USD 1 trillion, measured in terms of the value of lives lost and ill health (OECD, 2014) affecting productivity and growth at several levels.

In a modern dispersed production system, time has become the critical factor and timely delivery of components has replaced traditional stock-holding. Broadening international trade links have brought a greater volume of good, moving further and in increasingly complex and interdependent ways. The cost of transporting goods affects the volume, direction and pattern of trade. Barriers to trade and transport have a significant effect on international trade and therefore growth. OECD analysis shows that a 1% reduction in transaction costs could increase world income by USD 40 billion (OECD, 2009). All components of trade logistics impact trade more significantly, by several magnitudes, than distance or freight costs do (OECD, 2011).

Global recovery expected to continue but downside risks remain

Table 1.1 shows Gross Domestic Product (GDP) measures for recent years and expectations for the coming years from the most recent economic outlooks produced by the Organisation for Economic Co-operation and Development (OECD), the International Monetary Fund (IMF) and the World Bank. The global activity strengthened in 2013 and the recovery is expected to continue at a moderate pace in 2014-15. Global growth expectations are still slightly more pessimistic now than in the recent past. The world GDP growth rate

is expected to rise to around 4% in 2015 after a few years of a somewhat weaker performance following the initially quick rebound after 2008. This global average is the result of high growth rates in emerging economies and slow growth in higher income countries. For 2014 and 2015, growth is expected to accelerate especially in the latter, while in emerging economies growth is also firming gradually. Recent growth and near-term expectations differ within the broad groups of "higher' and "lower' income economies. The World Bank forecast the annual growth to rise above trend in the United States (3% in 2015) while the performance of the Euro area has been weak and is expected to gain momentum only slowly. Among the emerging markets, growth is projected to pick up only modestly. In China, growth has eased and is likely to be lower than in the recent past in 2014 and 2015.

Table 1.1. **GDP growth, percentage change over previous year**

	2012	2013	2014	2015
OECD				
World	3.0	2.8	3.4	3.9
OECD countries	1.5	1.3	2.2	2.8
Non-OECD countries	5.2	5.0	4.9	5.3
China	7.7	7.7	7.4	7.3
World Bank				
World	3.2	3.1	3.4	4.0
High income countries	1.5	1.3	1.9	2.4
Developing countries	4.8	4.8	4.8	5.4
IMF				
World	3.2	3.0	3.6	3.9
Advanced economies	1.4	1.3	2.2	2.3
Emerging economies	5.0	4.7	4.9	5.3

Source: OECD Economic Outlook 95, Volume 2014/1, May 2014, Table 1.1; *IMF World Economic Outlook*, April 2014, Table 1.1; *World Bank Global Economic Prospects*, June 2014, Table 1.1.

Global economic growth, since the financial crisis, has been slow and downsize risks remain especially for emerging market economies. In China, policy stimulus (via investment in transport infrastructure among others) has supported growth since the financial crisis but an unsuccessful transition from investment led (and debt-financed) growth in the developing world to more consumer driven growth could suppress growth prospects in other regions of the world. Geopolitical uncertainties, partly related to events in Ukraine, have increased risk for negative spillover effects for growth in many of the economies in the region.

Modest trade growth projected for near-term

The fall in world trade during the financial crisis was greater than in previous recessions. A specific feature of the decline was the globally-synchronised nature of the trade collapse. The fragmentation of production and the global nature of supply chains mean any impact on value added is multiplied in each production stage (OECD, 2009). The economic shock of 2008 had a dramatic impact on trade volumes. The rebound was equally quick and spectacular immediately after the shock, but growth rates slowed down strongly as of 2011. In 2012 and 2013, growth in merchandise trade has averaged slightly above 2%, compared with the 20-year average of over 5% (Table 1.2). Expectations are for stronger growth in 2014 and 2015, with growth picking up both in developed and developing economies.

Table 1.2. **World merchandise trade, percentage change over previous year**

	2010	2011	2012	2013	2014	2015
World	13.9	5.4	2.3	2.1	4.7	5.3
Exports						
Developed economies	13.3	5.2	1.1	1.5	3.6	4.3
Developing economies and CIS	15.1	5.8	3.8	3.3	6.4	6.8
North America	15.0	6.5	4.5	2.8	4.6	4.5
South and Central America	4.7	6.8	0.8	0.7	4.4	5.5
Europe	11.4	5.7	0.8	1.5	3.3	4.3
Asia	22.7	6.4	2.7	4.6	6.9	7.2
Other regions	5.6	2.1	4.3	0.3	3.1	4.2
Imports						
Developed economies	10.6	3.4	0.0	-0.2	3.4	3.9
Developing economies and CIS	18.3	8.1	5.1	4.4	6.3	7.1
North America	15.7	4.4	3.1	1.2	3.9	5.1
South and Central America	22.4	13.1	2.2	2.5	4.1	5.2
Europe	9.4	3.2	-1.8	-0.5	3.2	3.4
Asia	18.2	6.7	3.6	4.5	6.4	7.0
Other regions	10.9	8.4	9.8	2.9	5.8	6.6

Source: World Trade Organisation, Press release 14, April 2014.

In recent decades, global economic development has been characterised by the gradual shift of economic mass from developed to emerging economies. More recently, regional differences have emerged in paths of recovery following the financial and economic shocks of 2007-08 and after. Exports and imports of developed economies have grown at below world average rates over the last few years, while trade of developing economies has grown faster than the world average. Expectations for near-term merchandise trade growth suggest these phenomena to continue, with especially exports from Asia growing faster than any other region (Table 1.2).

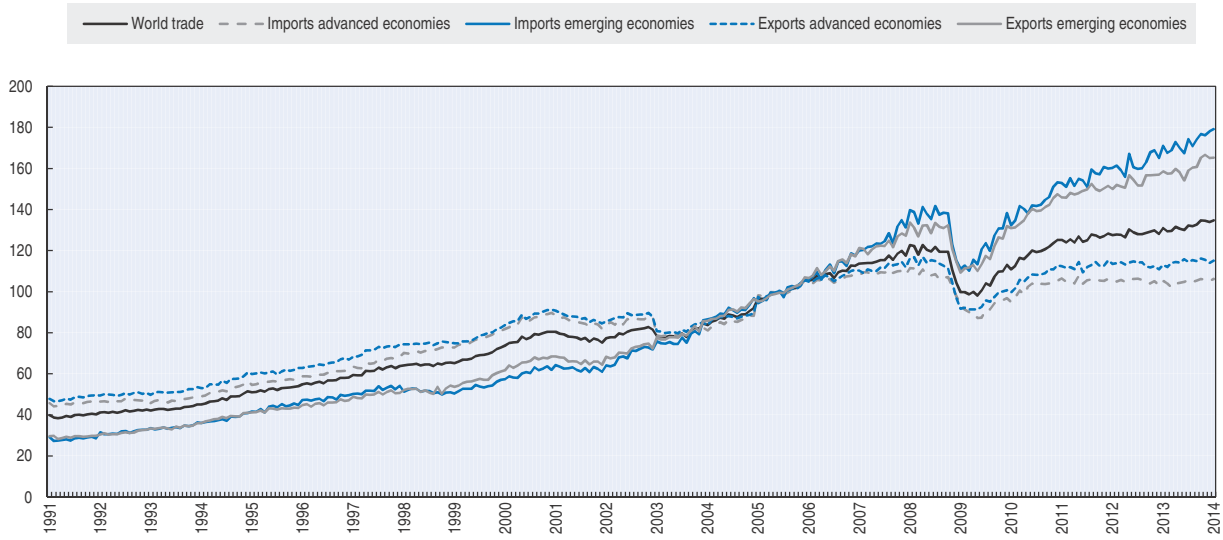
Figure 1.1 highlights the difference in trade growth between emerging and advanced economies, with the former on a higher growth path since the early 2000s and the high growth resumed post-2008. It is not surprising that growth is slower over the long run in advanced economies, but the very weak performance since late 2010 is a cause for concern. The low growth rates of global trade in recent years can be attributed to tepid export growth from advanced economies and in particular to weak demand in these economies, with low import demand growth and – correspondingly – slower growth of exports from emerging economies. Since the last update, the gap between emerging and developed economies has grown further during 2013.

Trade drives global maritime and air freight volumes

The development of global trade is a specific driver of maritime and air freight transport volumes. Trade between countries has grown faster than global output over the past decades, as a consequence of rising levels of development and trade liberalisation in emerging economies, increasing exchange of similar goods, and strong geographic fragmentation of production. The result is that the ratio of international trade in manufactured goods to production of these goods was twice as high in 2010 as it was in 1990.

Figure 1.1. **Monthly index of world trade**

Advanced and emerging economies, 2005 = 100



Source: CPB Netherlands Bureau for Economic Policy Analysis, *World Trade Monitor*, January 2014.

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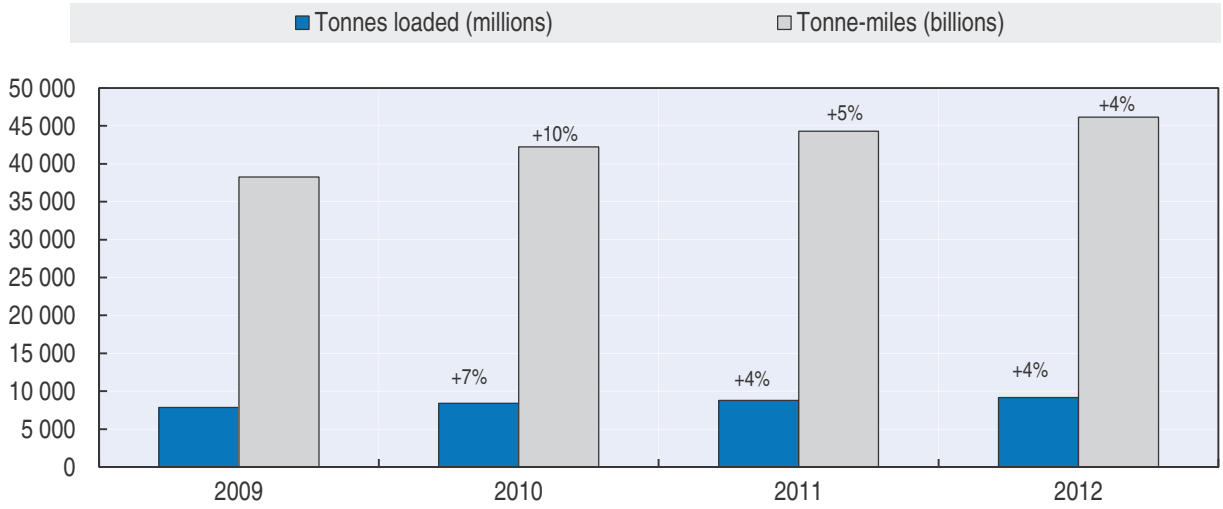
Maritime transport is the backbone of international trade, with over 80% of world cargo by volume transported by sea. Since the recovery from the 2009 recession, international sea cargo continued to outperform world GDP growth. World seaborne trade, measured in tons loaded, grew 4% to 9.2 billion tons in 2012, or 11% above the pre-crisis peak in 2008, according to United Nations Committee for Trade and Development (UNCTAD) preliminary estimation. In tonne-miles, maritime transport grew by 4%, reaching 46 billion tonne-miles (Figure 1.2). Recent trade projections suggest that the world seaborne trade growth will stabilise to moderate levels in the near-term. However, growth is expected to pick-up in the long run (see Chapter 3).

Figure 1.2. **World seaborne trade 2009-12**

Million tonnes and billion tonne-miles and annual % change



Source: *UNCTAD Review of Maritime Transport 2013.*

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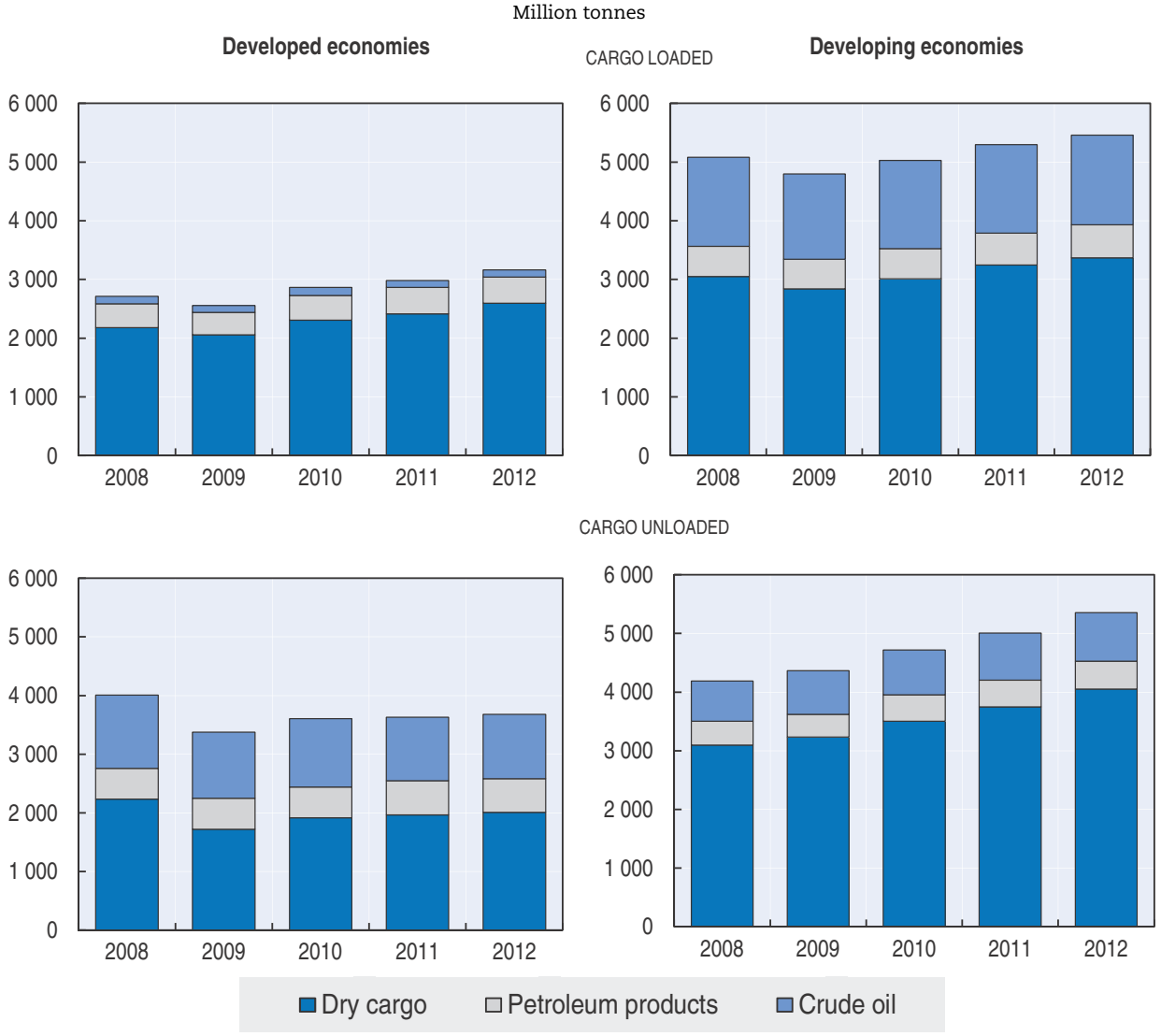
The total amount of goods unloaded (in tonnes) in developing economies reached 28% above pre-crisis 2008 peak in 2012 while in developed economies volumes were still 8% below their 2008 peak (Figure 1.3). Goods loaded in developing and developed economies reached 7% and 16% above pre-crisis peak. The above trends suggests strong growth of import demand in developing economies, weaker economic activity in developed countries and increasing trade among developing economies, especially intra-Asian and South-South trade (UNCTAD, 2013). This is also reflected in the development of container traffic. Asia remains by far the most important region for container trade and in 2013 the world's ten leading container ports were located in Asia (Figure 1.4). Container volumes continued to grow at all ports except for Hong Kong where traffic fell for the second consecutive year as a result of increasing competition from rival ports in southern China and the Pearl River Delta area and shift in ocean carrier alliances (Journal of Commerce, 2014).

Figure 1.3. **World seaborne trade by type of cargo and country group**



Source: UNCTAD Review of Maritime Transport 2013.

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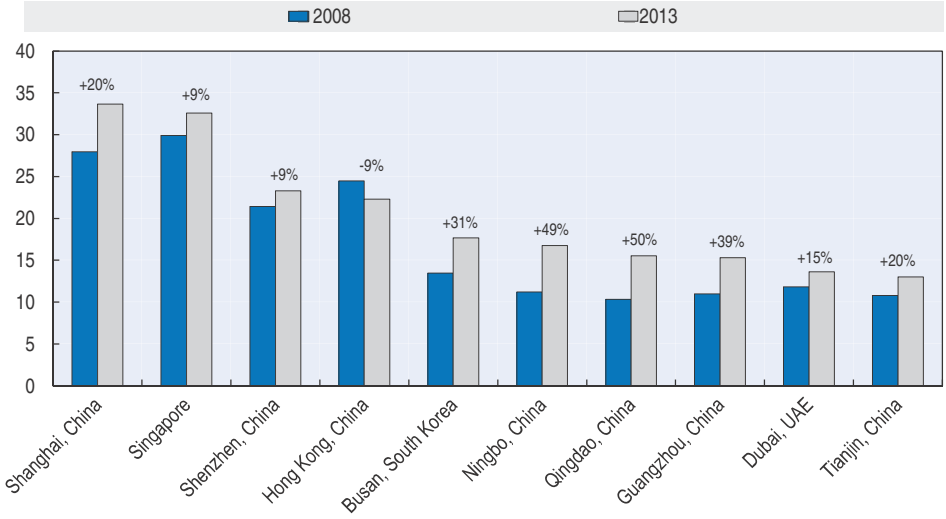
Figure 1.4. **The 10 leading world ports in terms of container traffic**

20 foot equivalent units (TEU) and annual % change



Note: TEU: Container traffic measured in twenty-foot equivalent unit as all containers handled, including full, empty and transshipped containers.

Source: Based on Lloyd's List Intelligence, Ports seize growth opportunity, on 17.3.2014.

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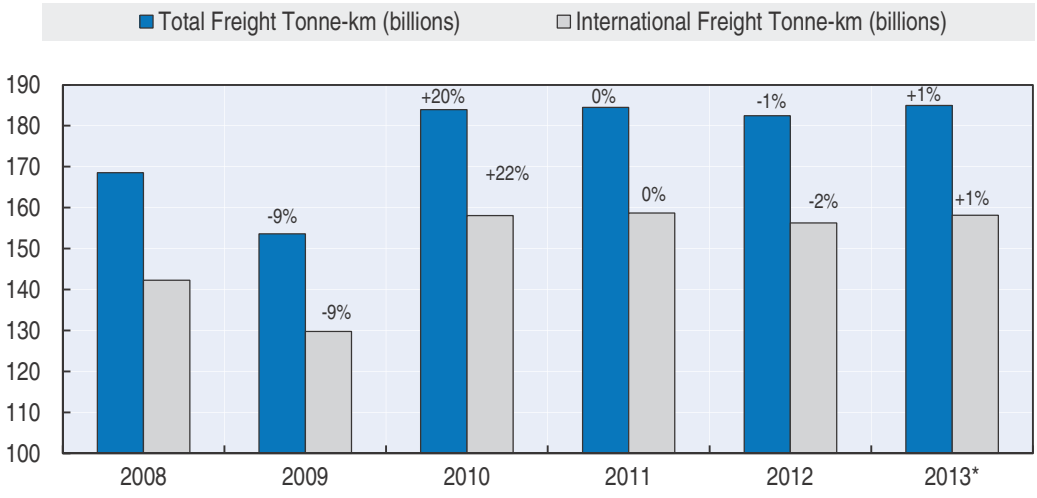
Near-term outlook for air freight suggests slow growth

Air freight transport rebounded in 2010 and grew 20% from the previous year to a new high of 184 billion freight tonne-kilometres (Figure 1.5). The strong performance of air freight in 2010 was partly led by inventory rebuilding after the economic downturn, together with rising consumer demand. This growth did not sustain, however, and air freight stagnated to zero growth in 2011, followed by a decline of 1.1% in 2012, measured in freight tonne-km. The slowdown in world trade growth, shifts in the commodity mix

Figure 1.5. **World air freight traffic**

Total and international



* Data for 2013 a preliminary estimate.

Source: Based on IATA Air Freight Analysis December 2013 and ICAO Annual Report of the Council 2012.

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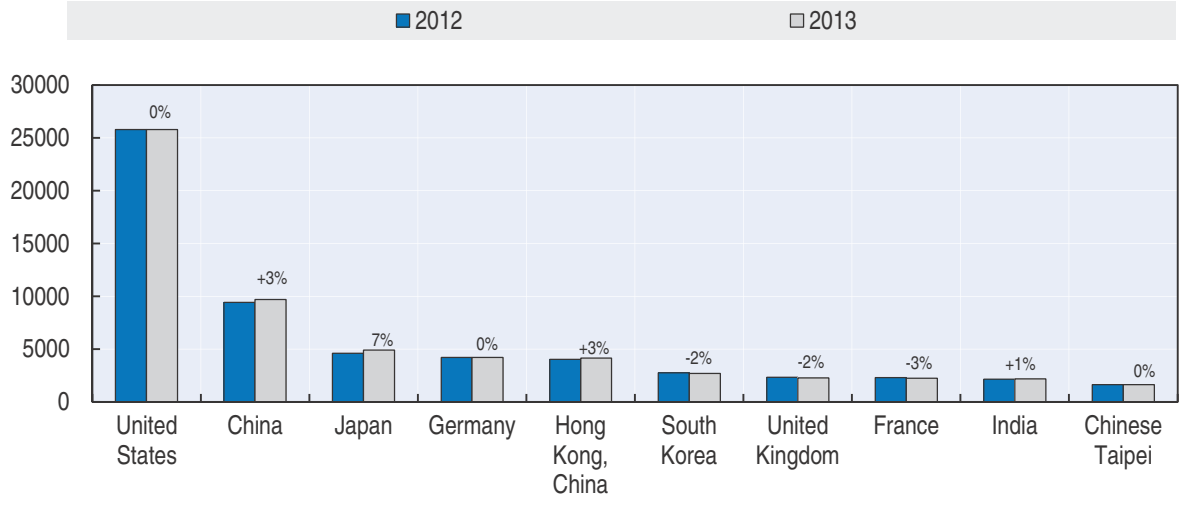
favouring sea transport and continuing economic weakness in developed countries were among the factors contributing to the negative growth in the air freight market in 2012 (IATA Air Transport Market Analysis 12/12). Freight volumes rebounded again by a modest 1.4% in 2013 while average freight load factor remained at 45%, unchanged from the previous year. Although domestic traffic growth (2.5%) outperformed international traffic (1.2%) in 2013, international air freight increased to 11% above the pre-crisis peak while domestic air freight just reached the pre-crisis peak of 2007. The International Air Transport Association (IATA) forecasts an annual average growth rate of 4.3% for 2013-17 (IATA Airline Industry Forecast 2013-17), significantly below long-term historical trend.

Asia Pacific airlines were the most affected by the slowdown in trade growth (-1.0%) in 2013. The government shutdown in October 2013 adversely impacted trade for North American carriers (-0.4%). European airlines recorded a modest 1.8% growth while Middle Eastern carriers experienced a robust 12.8% increase, the strongest of any region, reflecting solid economic and trade growth of nations in the Gulf region and better demand in Europe (IATA Air Freight Market Analysis 12/13).

Figure 1.6. **Air freight volume by country**

Thousand tonnes and annual % change



Source: Airport Council International.

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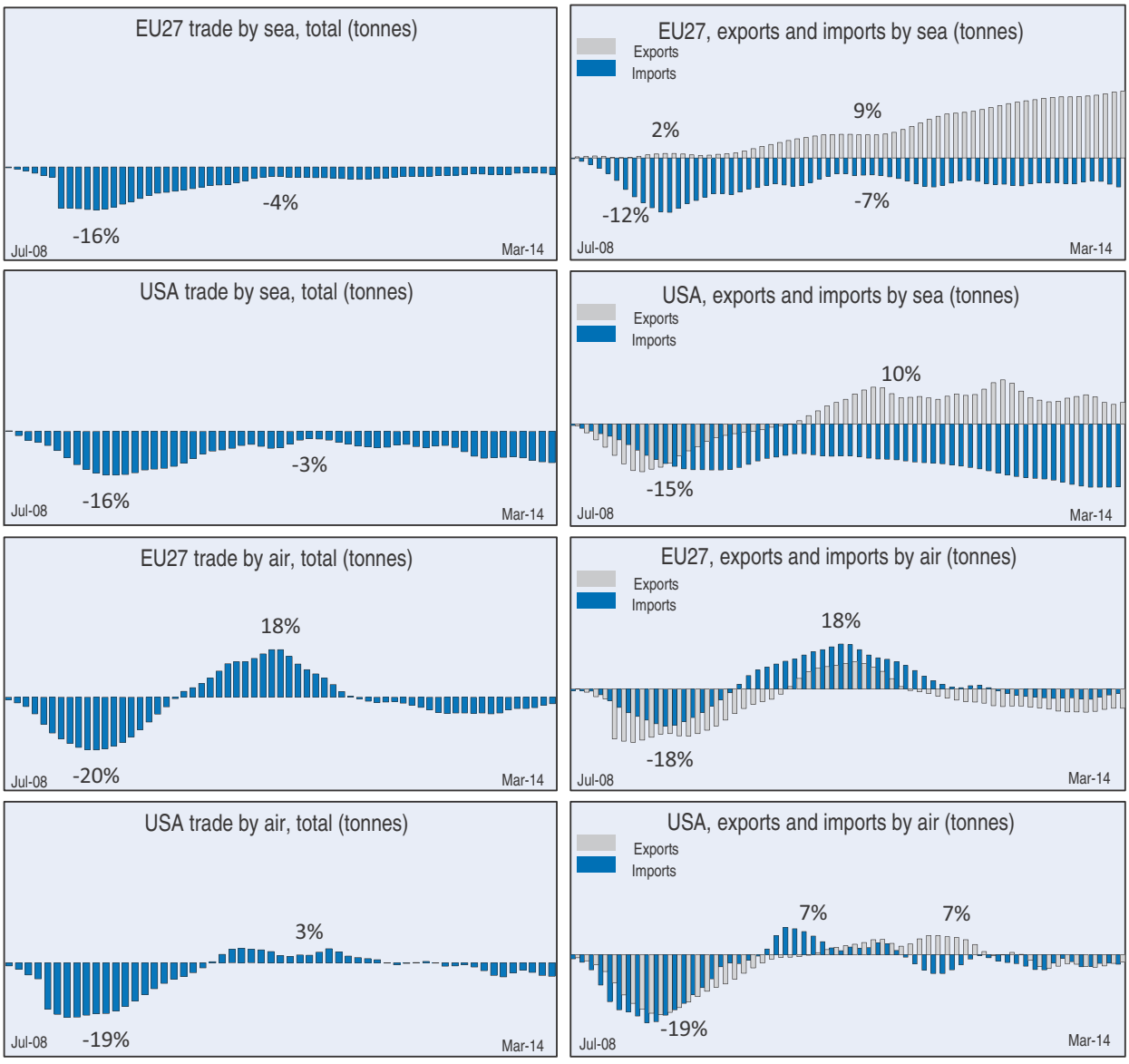
Global freight data reinforces the observation of a continuous shift of economic mass to emerging economies

Data are from the ITF Trade and Transport database, which compiles monthly data from several sources to obtain a picture of weights transported by sea and by air from and to the European Union and United States. Our latest data reinforces the observation of a shift of economic mass to emerging economies and of weak recovery from the crisis in advanced economies and in Europe in particular. Total sea freight transported to and from the European Union (EU) and the United States continued to stagnate below pre-crisis levels. Exports and imports showed diverging trends where exports grew strongly since the 2009 crisis while imports remained weak (Figure 1.7). Exports to BRICS, and more specifically to China and India, have been the locomotive of European and North American growth since the crisis of 2008. According to our latest seasonally adjusted data, exports by

Figure 1.7. **Freight transported by air and sea from the EU and United States**

Monthly trend from pre-crisis peak June 2008, tonnes, % change



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sea from the EU and the United States, especially to BRICS economies, continued to grow reaching 43% and 92% above pre-crisis levels in the first quarter of 2014. However, trade shows signs of slowing down and the challenge of structural change in, for example, China's growth strategy remains strong as ever, with increasing downside risks to continuing along the path of export orientation and a domestic focus on investment rather than consumption.

Air freight tonnes transported to and from the EU and the United States declined strongly after the shock of 2008, then rebounded quickly reaching pre-crisis peak by early 2010. Traffic volume increased to 18% above pre-crisis levels at the last quarter of 2010 in the EU. However, since 2011, cargo volumes for both EU27 and the United States have stagnated slightly below pre-crisis levels. Air freight, considered as a lead indicator,

suggests further uncertainty for economic growth particularly in the EU. Recent geopolitical events combined with regional instability in the Middle East and North Africa further increase these uncertainties.

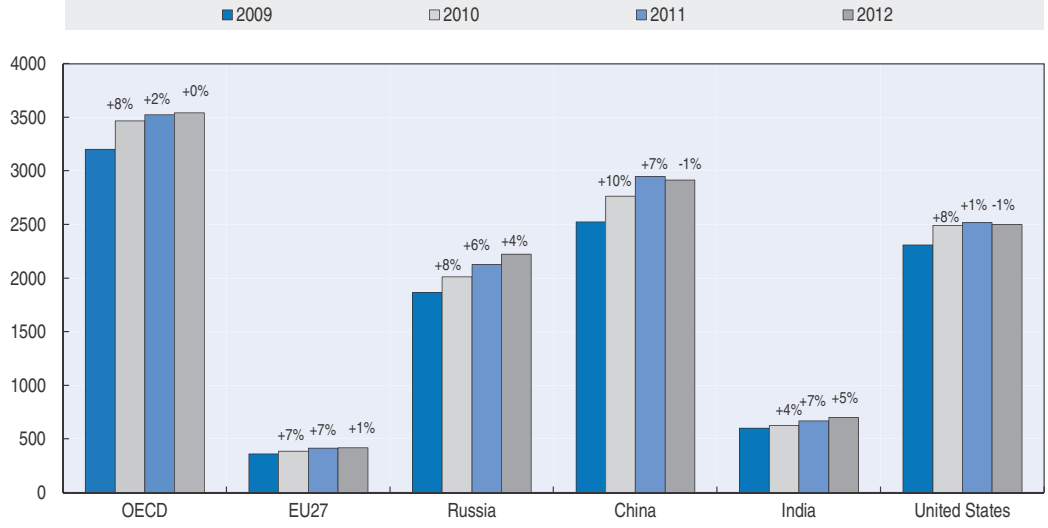
Surface freight volumes slowing down in developed economies

Rail freight growth slowed down in 2012 and preliminary data for 2013 indicate further decline. Rail freight transport in the OECD countries was severely hit by the global crisis in 2009 (-9% compared with 2008). Freight volumes rebounded back to pre-crisis levels by 2011. However, the growth slowed down to 0.4% in 2012. After the initial shock in 2008 (-18%) in the European Union, rail freight volumes increased 7% annually until 2011 after which the growth slowed down in 2012 (1%). According to our preliminary data, growth turned negative in 2013 showing a decline of -1%. In the United States, rail freight volumes increased by 8% and 1% respectively in 2010 and 2011, nearly reaching the 2008 level, only to stagnate again in 2013 (-1%), based on preliminary estimates from our quarterly statistics. Among major emerging economies, India and the Russian Federation continued to register strong year-on-year growth as freight volumes registered 5% and 4% increases in 2012. China, following several years of growth, registered a 1% decline in rail freight tonne-kilometres. The United States, China and India account for nearly 80% of total estimated global rail freight.

Hit hard by the global crisis in 2009, road freight volume grew 3% annually in the OECD from 2010 to 2012. Despite the growth, overall tonne-kilometres were still 9% below the pre-crisis levels in 2012. After initial drop of 10% in 2009, road freight is struggling in the European Union. Tonne-kilometres grew 3% in 2010 but growth slowed to 1% in 2011 and turned finally negative (-5%) in 2012, overall volumes remaining below the pre-crisis peak. Our preliminary estimate for the EU area in 2013, covering 75% of the total road tonne-kilometres, indicates a zero growth decline for road freight in the European Union. Road freight activity in emerging economies, especially China and India, continued to expand throughout the period. Tonne-kilometres increased between 17% and 18% annually in China. In India, freight volume grew 11% in 2010, 7% in 2011 and 4% in 2012.

Figure 1.8. **Rail freight**

Billion tonne-kilometres and annual % change



Note: Data for Belgium, Italy, Luxembourg and Russia estimate for 2012.

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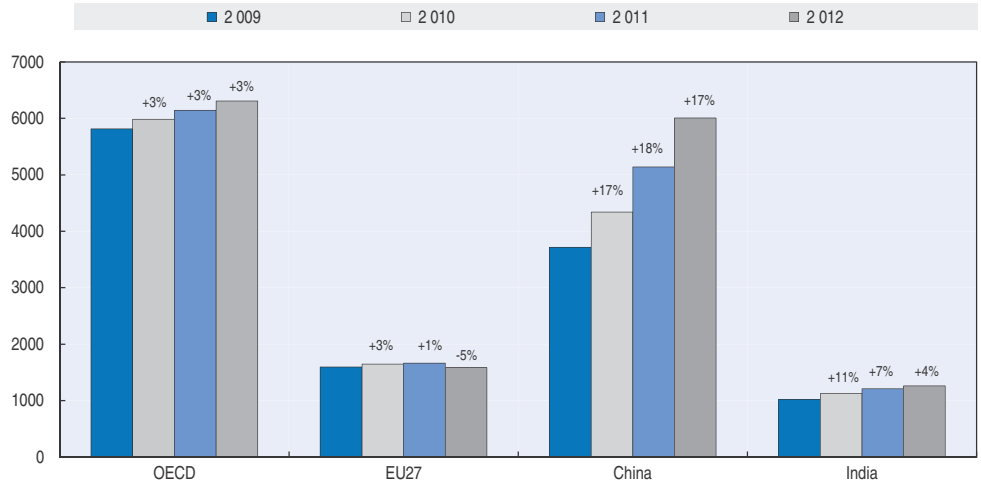
Figure 1.9. **Road freight**

Billion tonne-kilometres and annual % change



Note: Data for Canada and United Kingdom estimated for 2012. Data for Malta not available.

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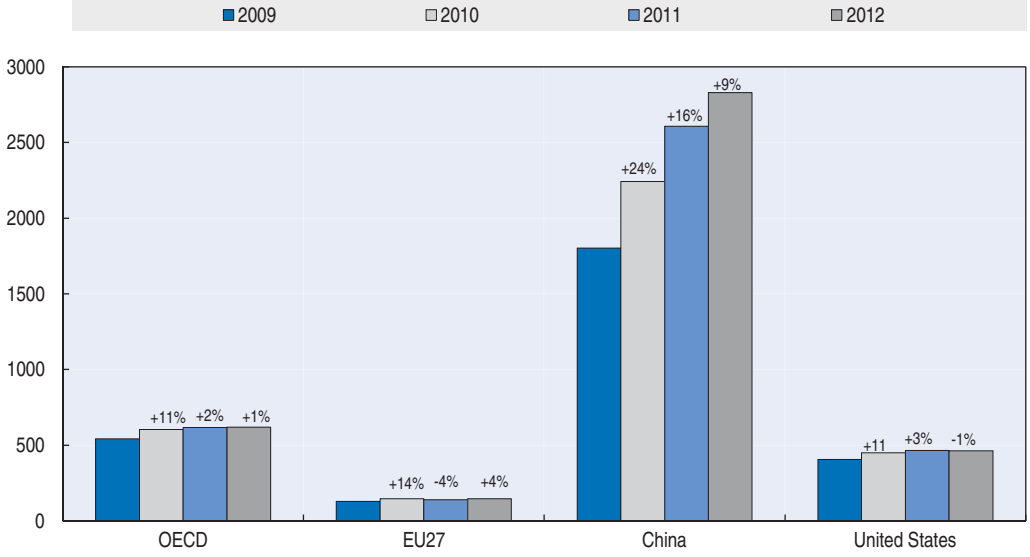
Freight transported by inland waterways also registered strong recovery in the OECD and the European Union in 2010 after the decline in 2009. Freight volumes in the OECD countries rebounded and grew by 11% in 2010. However, the growth in volume slowed done markedly in the OECD as tonne-kilometres grew only by 2% in 2011 and 1% in 2012. In the United States and European Union, growth in volume has turned negative or show only slow growth since 2011. The economic crisis also had an impact on inland waterway freight in China where tonne-kilometres grew only by 4% in 2009. Freight volumes grew rapidly in 2010 and 2011, recording 24% and 16% growth in respective years. Growth shows signs of slowing down also in China. Tonne-kilometres grew by 9% in 2012.

Figure 1.10. **Inland waterways freight**

Billion tonne-kilometres and annual % change



Note: Data for Switzerland estimated for 2011 and 2012.

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Global passenger volumes continue to grow

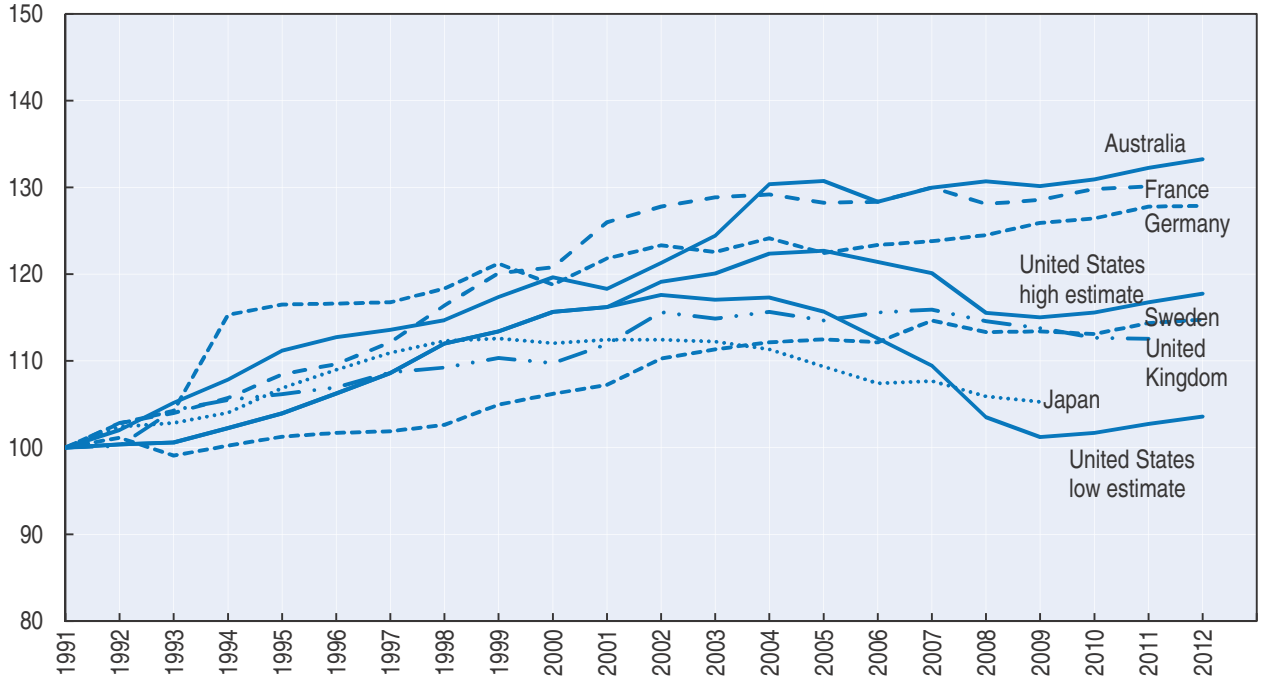
Car use shows plateauing in developed economies

As discussed earlier in this chapter, the growth of passenger vehicle travel has decelerated in several high-income economies and in some growth has stopped or turned negative. This slowdown is evident from Figure 1.11 that shows an index of passenger-kilometre volumes by car (and by light trucks and/or vans where relevant) in a selection of high-income economies from 1990 through 2012. In France, car use is virtually unchanged since 2003. In Japan, the trend is even reversed and car use has been declining since 1999. In the United Kingdom growth turned negative in 2007 having slowed down considerably since 2003. The United States displays a decline since around 2005 or even earlier. More recent data, however, appear to suggest an increase in growth rates. This suggests that the economic recession and relatively high fuel prices could explain part of the recent decline in the growth of travel by car.

Slowing population growth, population ageing and increasing urbanisation contribute to the change in passenger vehicle use in several countries. There is evidence that the growth in car use has been reduced through policy interventions, particularly in urban areas and sometimes at the national level. Research also reveals remarkable changes in the intensity of car use within some socio-demographic subgroups. Notably, car use per capita among young adults (men in particular) has declined in several countries in recent years. It is as yet not entirely clear why this decline occurs, with competing – or complementary – potential explanations relating to attitudinal and lifestyle changes (e.g. starting a family

Figure 1.11. **Passenger-kilometres by private car**

1991 = 100



Note: The Federal Highway Administration estimate of vehicle occupancy in the United States has been revised for 2009 based on the 2009 National Household Travel Survey (NHTS), resulting in a lower occupancy rate than previously. High estimate applies the vehicle occupancy based on 2001 NHTS while low estimate is based on a gradual decline from 2001 rate to 2009 rate.

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at later age), to unfavourable economic conditions for increasing numbers of young adults (e.g. rising inequality and higher unemployment) and to increased availability of options other than car use to participate in activities (e.g. more ubiquitous public transport, internet shopping and socialising). Mobility choices, including car ownership and use, appear to be changing. One emerging insight is that transport users are becoming more diverse, both in terms of preferences for lifestyles and mobility and in terms of budgets.

As a consequence, confidence in projections of mobility and car use volumes is undermined and simple, reduced form approaches based mainly on GDP and population further lose their appeal. Rising uncertainty over mobility choices is exacerbated by rising uncertainty over the future development of factors like household income. The rising uncertainty in forward-looking analysis needs to be acknowledged and if some policies are more robust to uncertainty than others, such policies become relatively more appealing. Rising inequality and unfavourable economic conditions, including low wages and high unemployment, restrain budgets for increasing numbers of households. Rising costs of getting a driving license and of car insurance exacerbate these constraints, perhaps most for young adults. The affordability of mobility is a rising concern. Aggregate car use is the result of location and travel choices made by a diverse set of potential car users. These choices depend on preferences, incomes, and prices of various transport options and alternatives to travel. Some groups choose less car-oriented lifestyles and the increased availability of other transport modes and online alternatives makes it easier for them to do so.

In developing economies, the rule of thumb that mobility, and in particular car use, will develop in line with GDP as long as policies do provide strong steering in the opposite direction, remains broadly applicable (see Chapter 2). Furthermore, strong natural population growth and rural migration to cities where motorisation is often twice that of rural areas due to higher incomes will induce pressure towards higher motorisation. Possibly, attitudinal changes related to the availability of online activities could curb growth at an earlier stage than in high-income economies, and faster urbanisation leading to congestion can reduce growth in car use. However, this curbing effect will not necessarily materialise in the absence of policies that dis-incentivise car use. Balanced mobility policies conceivably could induce levelling off of car use at lower per capita car use volumes than are observed in currently high-income economies. Providing public transport is not enough for this – car use itself needs to be regulated through appropriate prices, and land-use policy. And even when car use is inconvenient because of high congestion and high purchase prices, the preference for personal mobility may lead users to turn to two-wheelers (motorcycles, in particular), as currently is the case in Asian and Latin American cities (see Chapter 4).

Air passenger volumes projected to grow nearly 5% per year in the near-term

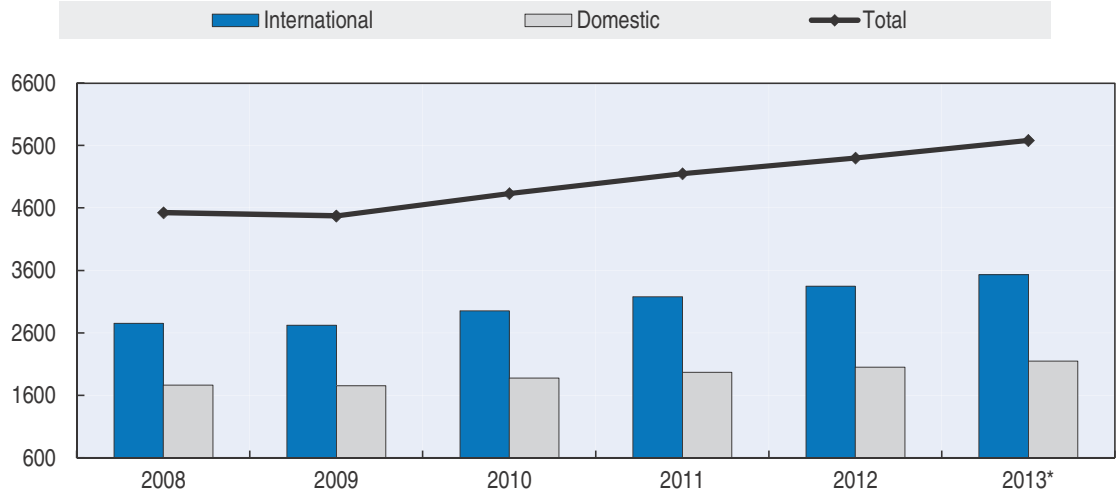
Air passenger-kilometres fell by 1.1% in 2009 as a consequence of the economic crisis. Despite the volcanic ash crises that substantially disrupted air passenger traffic in the first half of 2010, total passenger air transport has recorded a new high each year since recovery started in 2010. Revenue passenger-kilometres (RPK) increased 6.6% in 2011, breaking 5 000 billion threshold for the first time. In 2012 and 2013, passenger volumes grew around 5% per year, despite high fuel costs and relatively slow global economic growth. In total, air passenger volumes totalled 5 830 billion passenger-kilometres in 2013 (Figure 1.12). Growth in emerging regions outpaced growth in Europe and North America. Carriers in the Middle

East recorded the strongest growth of over 12%, benefitting from strong economy in the region, and in particular Saudi Arabia and United Arab Emirates, and solid growth in business related travel linked to other developing markets such as Africa (IATA, 2014). Total international passenger traffic increased by 5.4% in 2013. Domestic passenger-km volume grew by 4.9% in 2013, slightly lower than international RPKs. China, the second largest domestic passenger air transport market, recorded the strongest growth (11.7%) followed by Russia (9.6%). The United States, the world's largest domestic air passenger market with over 900 billion passenger-kilometres, grew 1.9% in 2013 (IATA Press Release No. 6 on 6/2/14). In terms of number of passengers, the world's top ten busiest airports were visited by more than 700 million passengers in 2013. Growth in Dubai airport was particularly significant (15%), surpassing Paris (Charles de Gaulle) airport in number of passengers.

Medium-term outlook for passenger traffic foresees continuing growth. IATA forecasts an overall 4.8% annual average growth rate between 2013 and 2017 (IATA Airline Industry Forecast 2013-17).

Figure 1.12. **World air passenger traffic – international and domestic**

Billion passenger-kilometres



* Data for 2013 a preliminary estimate.

Source: Based on IATA Air Passenger Market Analysis (12/13) and *ICAO Annual Report of the Council 2013*.

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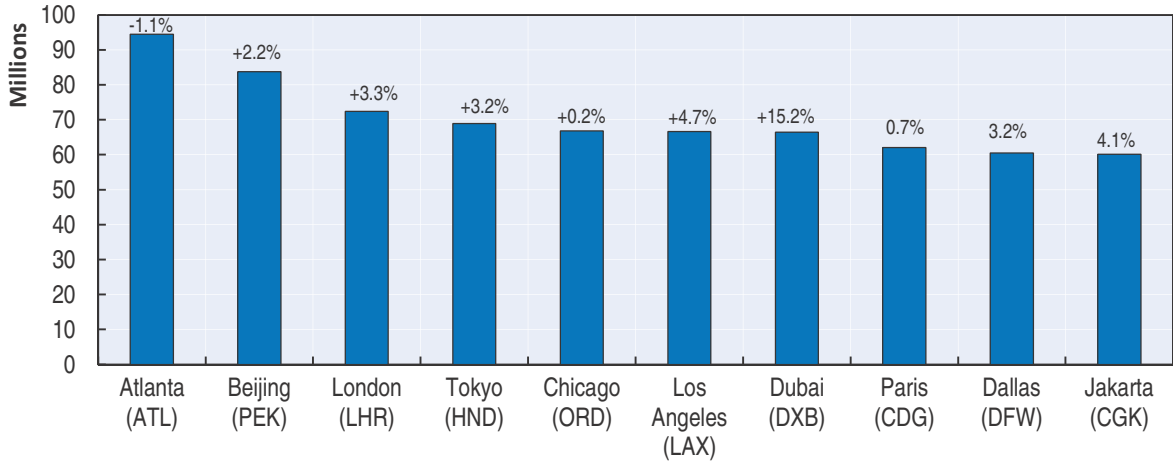
Rail passenger traffic grows at a steady rate in most countries

The economic crisis had a relatively small impact on rail passenger transport. Rail passenger-kilometres fell around 2% in the OECD countries in 2009 after which the volume recovered back to the pre-crisis levels by 2011 (Figure 1.14). In 2012, passenger volumes grew again by a steady 2%. In the European Union, passenger-kilometres stagnated in 2010 after falling 2%. In 2011, rail passenger-kilometres increased again by 2% followed by 1% growth in 2012, reaching the pre-crisis levels. There are marked differences between individual member countries. The United Kingdom registered a solid growth reaching 15% above pre-crisis peak while traffic volume in Italy and Poland remained 7.5% and 13.3% below pre-crisis peak of 2008. Rail passenger volume in Japan stagnated at pre-crisis levels while passenger-kilometres in the United States reached 10% above pre-crisis peak.

Figure 1.13. **Top 10 busiest airports in the world in 2013**

Number of passengers and % change over previous year



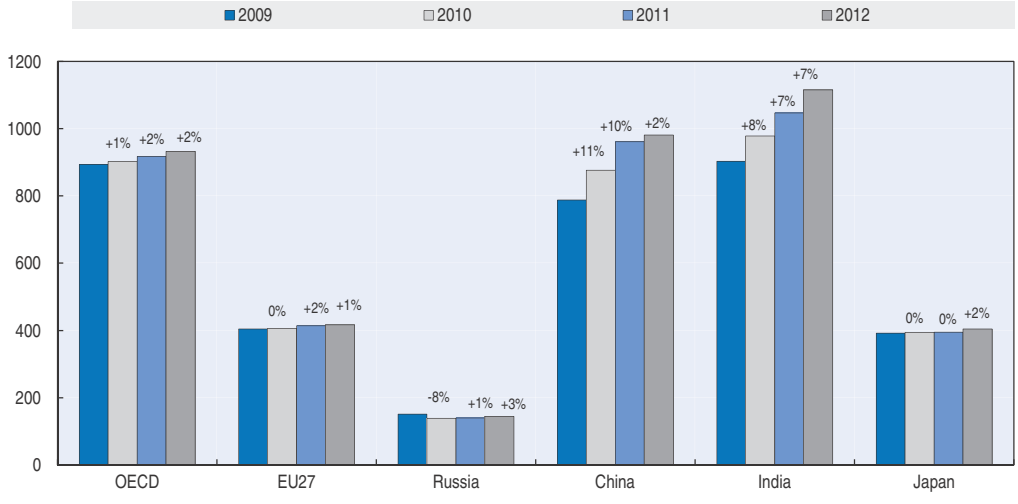
Source: Airport Council International Media Release on Preliminary World Airport Traffic and Rankings 2013 on 31/3/14. Available at *www.aci.aero/News/Releases/Most-Recent/2014/03/31/Preliminary-World-Airport-Traffic-and-Rankings-2013*.

StatLink http://dx.doi.org/10.1787/888933168476

India and China account for nearly 70% of the estimated global rail passenger transport. In India, passenger-kilometres increased 7% in 2011 and 2012 while in China passenger-km growth markedly slowed down to 2% in 2012 compared with previous growth rates. Russia reversed the negative trend and rail passenger-km grew 3% in 2012. Despite the growth, overall traffic volume remains 17% below the 2008 pre-crisis levels. Market share for rail in Russia has been in decline due to a more competitive air transport market.

Figure 1.14. **Rail passenger traffic**

Billion passenger-kilometres and annual % change



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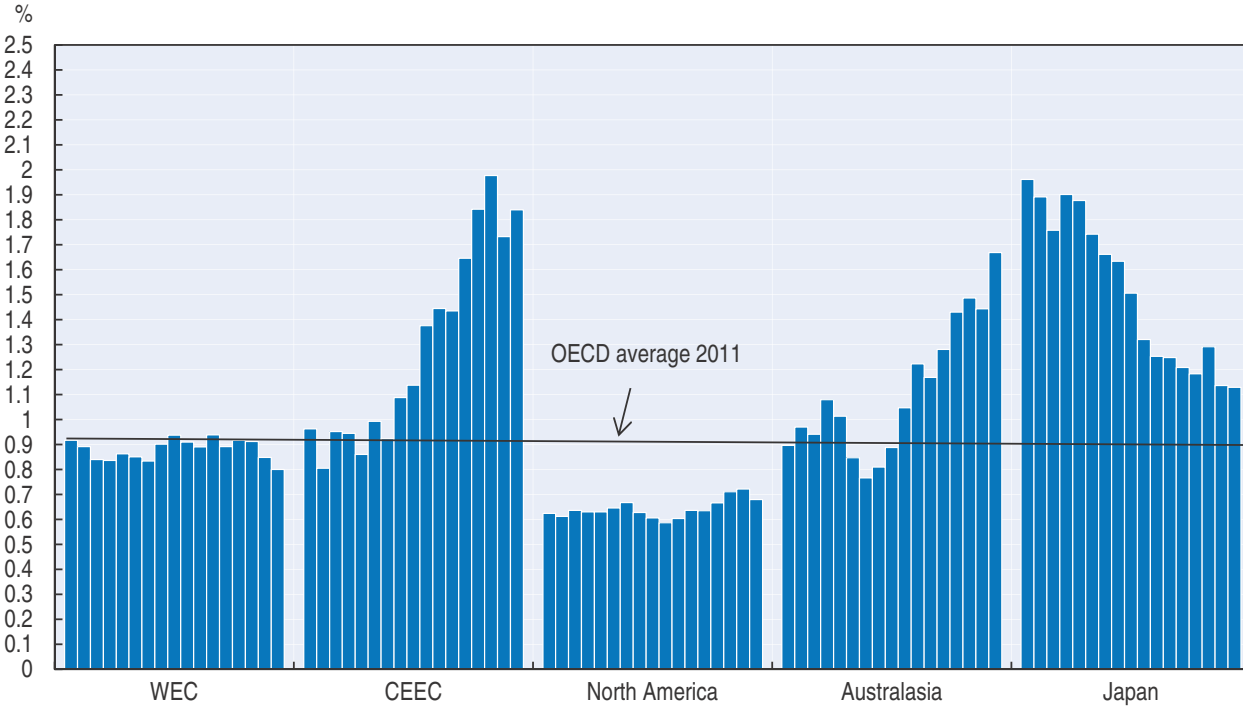
OECD countries spend 1% of GDP on road and rail infrastructure on average

The most recent data on gross fixed capital formation (investment) in inland transport infrastructure (road, rail and inland waterways) as a percentage of Gross Domestic Product (GDP) shows a slowly declining trend for the OECD as a whole over the period since 1995.

The investment share of GDP declined steadily from 1.0% in 1995 to 0.85% in 2004 after which it levelled off for few years. The level of investment rose temporarily between 2008 and 2009, likely driven by economic stimulus spending and declining GDP. After 2009, the investment share dropped to 0.85% in the OECD area (Figure 1.15). The International Transport Forum (and the former ECMT) has collected data on investment and maintenance expenditure on transport infrastructure since the late 1970s. In Western Europe, the investment share of GDP declined steadily from 1.5% in 1975 to 1.2 % in 1980 and further to 1.0% in 1982 after which it levelled off. Our latest data show that since 1995 the GDP share of investment in inland transport infrastructure has remained between 0.8% and 0.9% in Western European countries (WEC). There are only a few exceptions to this trend, notably Greece, Spain, Switzerland and Portugal which show significantly higher GDP shares over the period (reaching 1.6% – 2.0%). Since 2007, however, Greece and Portugal have converged closer to the WEC average, investments declining to around 1.0% of GDP. Data for North America also show a constant GDP share (0.6%) below the OECD average. The latest estimates indicate a slight growth in investment as a share of GDP, reaching 0.7% since 2009. These changes are, however, marginal and the investment share of GDP has remained relatively constant both in Western European countries and North America

Figure 1.15. **Investment in inland transport infrastructure by world region 1995-2011, % of GDP**

At current prices and exchange rates



Note: OECD includes 31 countries; excludes non-ITF states Israel and Chile (at the time of data collection); no data for Korea. WECs include Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, Turkey and the United Kingdom. CEECs include Albania, Bulgaria, Croatia, Czech Republic, Estonia, FYROM, Hungary, Latvia, Lithuania, Montenegro, Poland, Romania, Serbia, Slovakia and Slovenia. North America includes Canada, Mexico and the United States. Australasia includes Australia and New Zealand. Data for Japan exclude private investment.

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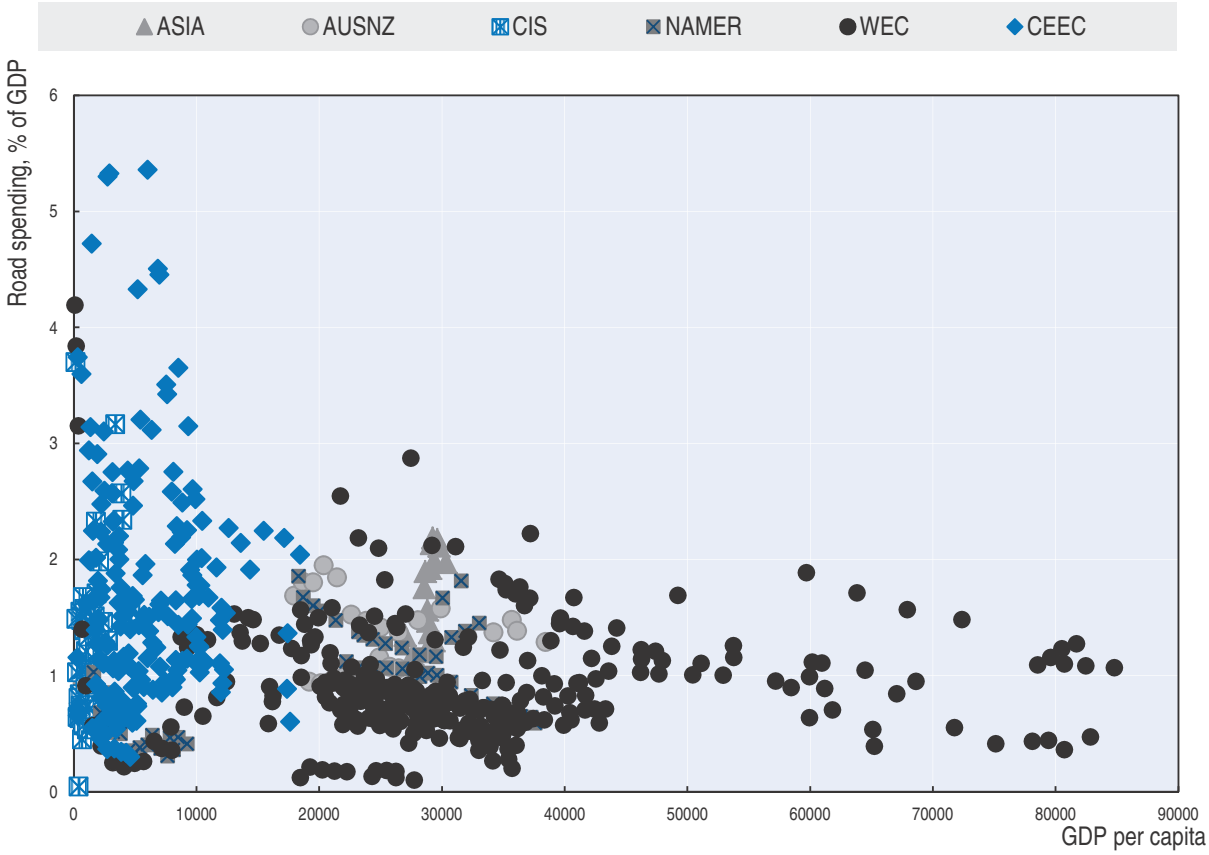
Trends for developing and transition economies differ markedly from those described above. The share of investment in inland transport infrastructure in Central and Eastern European countries (CEECs), which until 2002 had remained at around 1.0% of GDP, has grown sharply, reaching 2.0% in 2009 – the highest figure ever reported by these countries. Rising levels of investment in transition economies reflect efforts to meet rising needs especially for road network capital. Investment share of GDP fell to 1.7% in 2010, likely affected by the economic crisis. Data for 2011 again show increase, investment share reaching 1.8%. In the Russian Federation, investment share of GDP has also been high compared with Western European countries but more volatile. Investment in inland transport infrastructure as a percentage of GDP reached 1.9% in 2000 after which it has varied between 1.2% and 1.7%. For the last two years the share has remained at 1.4% of GDP.

Road spending generally declines with the level of GDP per capita

The difference between Western European countries and developing economies suggests there is a relationship between transport infrastructure spending and the level of income. Figure 1.16 plots total spending (investment and maintenance) on road infrastructure

Figure 1.16. **Road infrastructure spending**

Percentage of GDP, constant 2005 euros



Note: WECs include Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, Turkey and the United Kingdom. CEECs include Albania, Bulgaria, Croatia, Czech Republic, Estonia, FYROM, Hungary, Latvia, Lithuania, Montenegro, Poland, Romania, Serbia, Slovakia and Slovenia. CISs include Azerbaijan, Georgia and Moldova. North America includes Canada, Mexico and the United States. Australasia includes Australia and New Zealand. Data for Japan exclude private investment.

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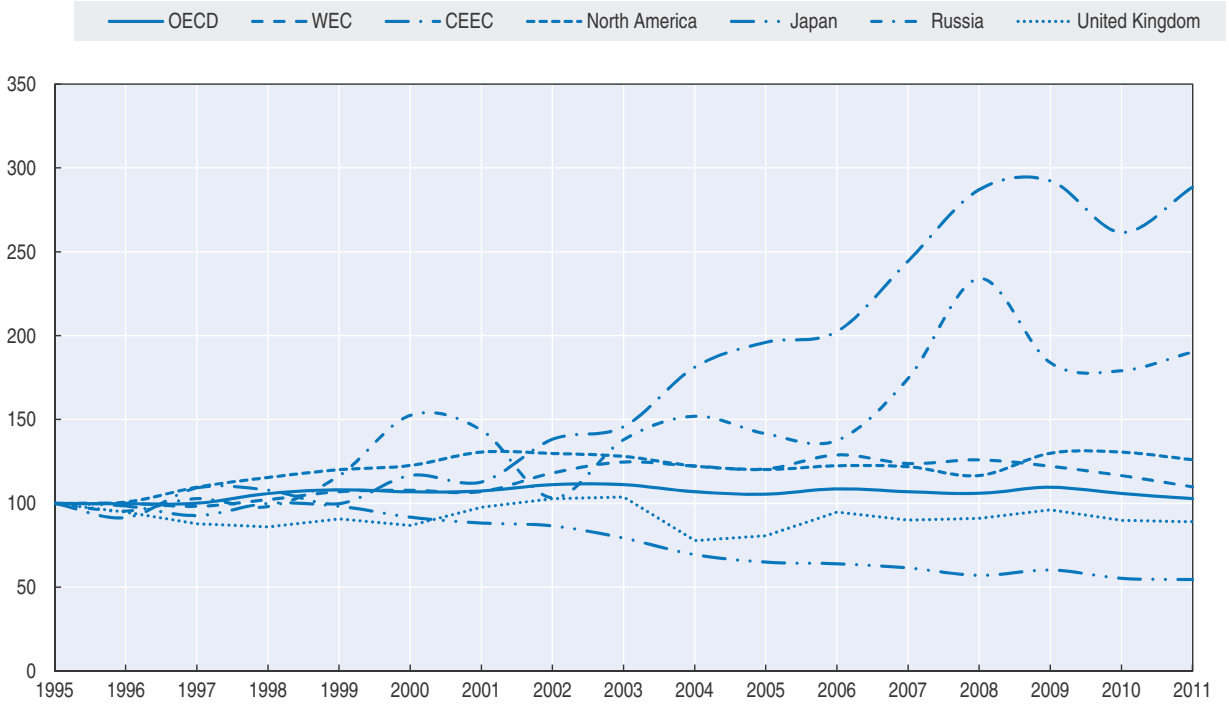
as a percentage of GDP against GDP per capita using data for over 40 countries between 1995 and 2011. This panel of over 600 observations gives strong support to the conclusion that the level of (road) spending generally declines with the level of GDP per capita. There are several potential reasons for this declining trend. As efficiency and productivity increase production becomes less transport intensive, potentially weakening the link between the GDP growth and transport demand and therefore infrastructure investments.

Volume of investment shows diverging trends between developed and developing economies

The volume of investment (expenditure in real terms) in the OECD total (excluding Japan) has grown around 30% in the last 15 years. Japan has followed a different trajectory (volume nearly halving in the same period) and its economy is large enough to affect the overall volume for the OECD significantly. Historically, transport infrastructure investment in Japan was relatively high in relation to GDP but has been in decline since the 1990s. Expenditures were affected by general budget cuts towards the end of the 1990's. Subsequently, modification of the allocation of revenues from gasoline tax, earlier earmarked for highway development and maintenance, has further reduced the level of investment in roads in Japan. If data for Japan are included, the volume of investment in the OECD peaked in 2003 after which it has remained fairly stable slightly above the 1995 level. The latest data show a 6% fall in investment since 2009 as volume declines close to the 1995 level. In Western European countries, the volume of investment started growing in 2002, and was nearly 30% above the 1995 level in 2006 after which the volume declined. The latest data for 2011 show volume only 10% higher than the 1995 level (Figure 1.17). The

Figure 1.17. **Volume of investment in inland transport infrastructure by world region 1995-2011**

At constant 2005 prices, 1995 = 100



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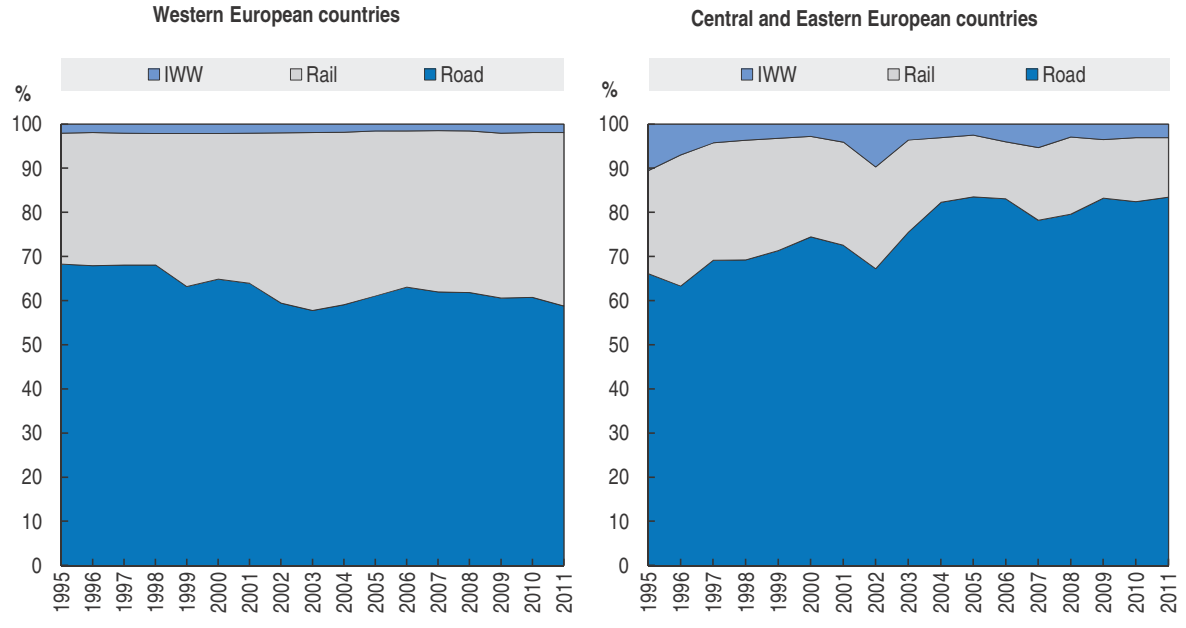
volume of inland infrastructure investment in North America grew by around 30% from 1995 to 2001. Our estimate suggests a slow decline in investment volume that continued all the way through 2008. Recent data indicate growth in the volume of investment in North America, returning to the 2001 level in real terms in 2011. The volume of infrastructure investment has accelerated strongly in developing and transition economies, notably in Central and Eastern European countries since 2003. This growth turned negative after reaching a record level in 2009. Investment in inland transport infrastructure declined 11% in real terms from 2009 to 2010. Data for 2011 show a renewed growth as volume of investment grew again by 10%.

Mature economies invest increasingly in rail while transition economies invest in roads

The share of rail investment of total inland transport infrastructure investment has increased from 17% to 23% for the OECD total from 1995 to 2011, according to our estimates. This trend is mainly determined by developments in Japan and Europe. Data presented in Figure 1.18 show long-run trends in the modal share of investment in Western European and Central and Eastern European countries. In the Western European countries, the share of investment in rail infrastructure has increased steadily from around 20% of total investment in inland transport infrastructure in 1975 to 30% in 1995 and further to 40% in 2011. The trend observed in our data for Western Europe is partly a reflection of political commitment to development of railways and the most recent data does not seem to indicate any change in this respect. Whereas Western European countries have increasingly directed their investment toward rail, Central and Eastern European countries are investing more heavily in roads. The share of roads in inland transport infrastructure investment increased from 66% in 1995 to 84% in 2005 in this region. The last few years, however, suggest a stabilisation of the trend and the modal split of investment remained at

Figure 1.18. **Distribution of infrastructure investment across rail, road and inland waterways**

Euros, current prices, current exchange rates



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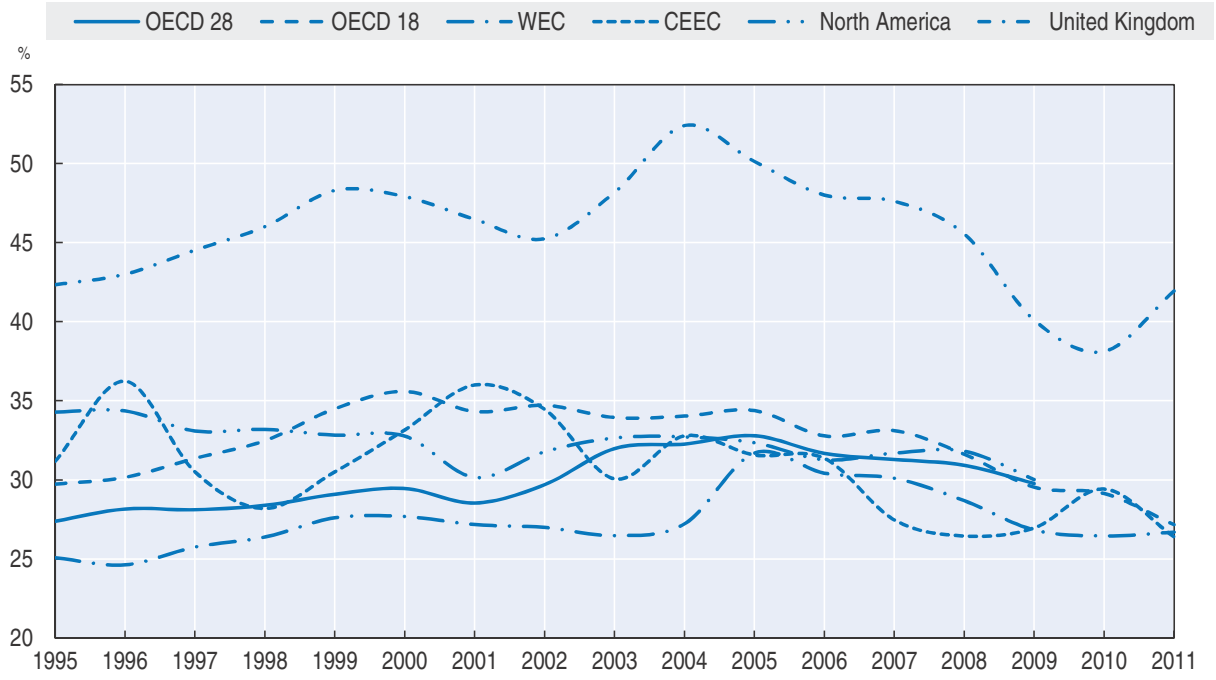
2005 levels in 2011 (Figure 1.18). The Russian Federation differs from the above trends. The share of road in the total inland transport infrastructure investment has declined from 60% in 1995 to around 45% in 2011. Rail share, in turn has increased from 37% to account for over half (53%) in the same period, according to our data.

Data indicate decline in road maintenance spending in relation to investment

In many countries observers have raised concerns about underfunding of road assets and the state of existing road infrastructure and its impacts on the competitiveness of the economy. Funding for road maintenance, particularly, may be postponed on the expectation that a lack of maintenance will not result in imminent asset failure (Crist et al., 2013). This concern is, however, difficult to verify due to lack of data on the condition of road assets. The available data on road spending suggest that the balance between road maintenance and investment has been relatively constant over time in many regions. The share of public expenditure on maintenance in total road expenditure has remained between 25% and 35%. In the 28 OECD countries for which comparable data are available through 2009, the share of maintenance in total road spending grew overall from 27% in 1995 to 33% in 2005 after which it gradually declined, to 30% in 2009. This declining trend is reinforced by data on 18 OECD countries up until 2011 which suggest further decline to 27% in 2011 (Figure 1.19). Data further suggest that funds allocated for road maintenance have declined especially in Central and Eastern European countries over the last few years,

Figure 1.19. **Share of public road maintenance in total road expenditure**

Euros, current prices, current exchange rates



Note: OECD 18 include Austria, Canada, Czech Republic, Estonia, Finland, France, Iceland, Ireland, Luxembourg, Mexico, New Zealand, Norway, Poland, Slovakia, Slovenia, Sweden, Turkey and the United Kingdom. WECs include Austria, Finland, France, Iceland, Ireland, Luxembourg, Netherlands, Norway, Sweden, Turkey and the United Kingdom. CEECs include Albania, Croatia, Czech Republic, Estonia, FYROM, Latvia, Lithuania, Poland, Serbia, Slovakia and Slovenia.

StatLink http://dx.doi.org/10.1787/888933168532

falling from above 35% in early 2000 to 26% of total road spending in 2011. In the eleven Western European countries for which comparable data are available, data suggest a surge in maintenance spending in 2005 after which the maintenance share has gradually fallen back to previous levels (27% of total spending). Similarly, the road maintenance share in North America has gradually declined from 35% in 1995 to around 30% in 2009 after which lack of comparable data hinders further analysis. Although these conclusions are affected by the quality and coverage of data, they do suggest an overall declining share of maintenance on total road spending especially over the last few years. This may not necessarily lead to an immediate asset failure and network disruption. The cumulative impact of deferred maintenance, however, increases asset and network vulnerability to local or systemic disruptions. In the long term, deferring maintenance can make roadway costs much greater than indicated by current expenditures.

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