



# EUROPEAN COURT OF AUDITORS

Special Report No 5

2013

## ARE EU COHESION POLICY FUNDS WELL SPENT ON **ROADS**?





Special Report No 5 // 2013

# ARE EU COHESION POLICY FUNDS WELL SPENT ON ROADS?

(pursuant to Article 287(4), second subparagraph, TFEU)

EUROPEAN COURT OF AUDITORS  
12, rue Alcide De Gasperi  
1615 Luxembourg  
LUXEMBOURG

Tel. +352 4398-1  
Fax +352 4398-46410  
E-mail: [eca-info@eca.europa.eu](mailto:eca-info@eca.europa.eu)  
Internet: <http://eca.europa.eu>

## Special Report No 5 // 2013

A great deal of additional information on the European Union is available on the Internet.  
It can be accessed through the Europa server (<http://europa.eu>).

Cataloguing data can be found at the end of this publication.  
Luxembourg: Publications Office of the European Union, 2013

ISBN 978-92-9241-270-8  
doi:10.2865/71435

© European Union, 2013  
Reproduction is authorised provided the source is acknowledged.

*Printed in Luxembourg*

# CONTENTS

## Paragraph

### GLOSSARY

### I–VI EXECUTIVE SUMMARY

### 1–5 INTRODUCTION

### 1–5 COHESION POLICY FUNDS AND INVESTMENTS IN ROAD PROJECTS

### 6–9 AUDIT SCOPE

### 10–50 OBSERVATIONS

### 10–21 THE ROAD PROJECTS AUDITED PARTLY ACHIEVED THE INTENDED RESULTS

### 11–12 THE ROAD PROJECTS HAD SET OBJECTIVES ...

### 13 ... BUT THEIR IMPACT ON ECONOMIC DEVELOPMENT COULD NOT BE ASSESSED ...

### 14–18 ... AND MOST OF THEM DELIVERED LESS THAN THE PLANNED RETURN ON INVESTMENT ...

### 19–21 ... WHILE CLEARLY IMPROVING ROAD SAFETY AND HELPING TO SAVE TRAVELLING TIME

### 22–50 ENHANCED TRANSPORT CAPACITY COULD HAVE BEEN ACHIEVED AT LOWER COST

### 23–26 DIFFERENT WAYS OF COMPARING THE COST OF ROADS

### 27–30 THE ROAD PROJECTS MAINLY FOLLOWED THE MOST ECONOMICAL ROAD ALIGNMENT

### 31 TRAFFIC FORECASTS WERE IN THE MAJORITY OF CASES NOT IN LINE WITH ACTUAL ROAD USE

### 32–34 COSTS PER USER VARY SIGNIFICANTLY

- 35–37 EXPRESS ROADS WERE CLEARLY LESS COSTLY TO BUILD THAN MOTORWAYS
- 38–40 THE BEST POSSIBLE PRICE WAS NOT OBTAINED FOR ALL AUDITED PROJECTS
- 41–44 SIGNIFICANT COST DIFFERENCES FOR ROAD ACCESSORIES AND BRIDGE DECKS
- 45–50 COST OVERRUNS OF MORE THAN 20 % FOR 11 PROJECTS

## **51–55 CONCLUSIONS AND RECOMMENDATIONS**

### **ANNEX I — OVERVIEW OF AUDITED PROJECTS**

### **ANNEX II — COMPARISON OF TOTAL COST, CONSTRUCTION COST AND ROADWAY CONSTRUCTION COST OF THE PROJECTS AUDITED PER 1 000 m<sup>2</sup> IN EURO**

## **REPLY OF THE COMMISSION**

# GLOSSARY

**AADT:** Annual average daily traffic — most commonly used traffic counting method. The figure indicates the average number of vehicles crossing the measuring point during a 24-hour period. The figure therefore takes into account traffic for peak and low seasons of 1 year.



**Express road:** A road reserved for motor traffic, accessible from interchanges or controlled junctions only, and which:

- (i) prohibits stopping and parking on the running carriageway(s);
- (ii) does not cross at level with any other road, railway or tramway track or footpath;
- (iii) in most cases has at least four traffic lanes. The most common speed limit on express roads is 110 km/h.

**Greenfield projects:** Projects that are built on undeveloped land in a city or rural area either used for agriculture, landscape design or left to nature. Renovations sometimes have greenfield elements, e.g. when a carriageway is added to an existing road.

**ERDF Major Project:** A project co-financed from the European Regional Development Fund for which the total eligible cost is more than 50 million euro.



**Motorway:** A road specially designed and built for motor traffic, which does not serve properties bordering it, and which:

- (i) is provided, except at special points or temporarily, with separate carriageways for the two directions of traffic, separated from each other by a dividing strip not intended for traffic or, exceptionally, by other means;
- (ii) does not cross at level with any road, railway or tramway track, or footpath;
- (iii) is specially signposted as a motorway.

**OP:** Operational programme.

**Public Procurement by mathematical formula:** Tender process that is designed to exclude unsustainably low offers. The mathematical formula calculates the price limits below which offers would be excluded from further evaluation.

**Road alignment:** The route of the road, defined as a series of horizontal tangents and curves.

## EXECUTIVE SUMMARY

### I.

For the period from 2000 to 2013 the EU has allocated around 65 billion euro from the ERDF and Cohesion Fund to co-financing the construction and renovation of roads.

### II.

The Court audited 24 European Regional Development Fund (ERDF) and Cohesion Fund road investment projects in Germany, Greece, Poland and Spain to assess whether they achieved their objectives at a reasonable cost. The total cost of audited projects exceeded 3 billion euros.

### III.

The Court concluded that the road projects partly delivered results and fulfilled their purpose. In particular, all the road projects audited provided travelling time savings and improved road safety. However, several projects did not deliver the planned returns on investment as forecasted in cost-benefit analyses (CBAs). Moreover the assessment of the additional economic development deriving from the realisation of the projects was impossible due to lack of measurable indicators.

### IV.

The Court also concluded that insufficient attention was paid to ensuring cost-effectiveness of the projects. Most of the audited projects were affected by inaccurate traffic forecasts. The type of road chosen was not best suited to the traffic it carried. Motorways were the preferred option by beneficiaries, even for sections where express roads could have solved the traffic needs. Compared to the initial plan, the average cost increase was 23 % and time overruns averaged 9 months or 41 % when compared to the initial deadlines agreed in the construction contracts.

### V.

The lowest roadway construction costs were found in the projects audited in Germany, followed by Greek, Spanish and Polish projects. Cost per use was also cheapest in Germany while the most expensive was in Spain. Some procurement practices did not deliver optimal costs.

### VI.

The Court recommends that:

- (a) The Commission should analyse the differences in roadway construction costs between the Member States in order to identify the causes of significant price differences thereof and assure that the best practices are applied in future.
- (b) The EU co-financing of road projects should be made subject to the existence of clear objectives that are accompanied by indicators for travel time savings, gains in road safety, capacity improvements and effects on the economy. The co-financing should depend upon the use of reasonable and cost-effective technical solutions that are in line with the best practices identified and the steps taken by the Member States to ensure international competition on national and/or regional construction markets and focusing procurement systems on delivering the most economical offers.
- (c) The Commission should promote the exchange of best practices between national road administrations concerning optimum technical solutions for road projects based upon reliable traffic forecasts.
- (d) The Commission should consider the establishment of a European Union-wide unit cost information database for engineers preparing estimates for new projects, in order to help beneficiaries to lower the procurement prices.



# INTRODUCTION

## COHESION POLICY FUNDS AND INVESTMENTS IN ROAD PROJECTS

1. Enhancing accessibility is of key importance to strengthening national and/or regional economies, cohesion and competitiveness. Improving the road network is an important element to increase mobility for people and goods and therefore create the conditions for economic growth.
2. As the road investments are financed from the Cohesion Policy funds, they fall under the Shared Management set-up. Within Cohesion Policy, the Commission issues guidelines for drawing up Operational Programmes (OPs). At the beginning of the programming period, the Commission negotiates and approves the individual OPs proposed by the Member States. Its task is also to supervise the setting up and operation of management and control systems in the Member States. Later, its main role is to monitor the implementation of the OP, but it is not involved in the day-to-day management of individual projects. The Commission receives annual implementation reports from the Member States and participates in monitoring committees<sup>1</sup>. The Commission is ultimately responsible for the implementation of the budget<sup>2</sup>.
3. Each Member State decides which managing authorities are involved in the management of EU co-financing for roads, as roads expenditure can be handled at all levels of government, including ministries of transport, national or regional road agencies, regional administrations, county administrations and local government.
4. Infrastructure investments in the Member States are mainly financed from their national funds. The Organisation for Economic Cooperation and Development (OECD) has calculated that the EU Member States spent some 66 billion euro on road investments in 2010 alone<sup>3</sup>. In the course of the last two programming periods, the EU has provided on average some 4,9 billion euro per year for roads investments through Cohesion Policy funds and TEN-T<sup>4</sup> projects. In the Member States with the highest share of Cohesion Policy funds' allocation, a large majority of road projects are EU co-financed<sup>5</sup>.

<sup>1</sup> Council Regulation (EC) No 1083/2006 of 11 July 2006 laying down general provisions on the European Regional Development Fund, the European Social Fund and the Cohesion Fund and repealing Regulation (EC) No 1260/1999 (OJ L 210, 31.7.2006, p. 25).

<sup>2</sup> Article 17(1) of the Treaty on European Union (OJ C 326, 26.10.2012, p. 13) and Article 317 of the Treaty on the Functioning of the European Union (OJ C 326, 26.10.2012, p. 47).

<sup>3</sup> OECD International Transport Forum statistics, 'Road infrastructure gross investment spending', <http://www.internationaltransportforum.org/statistics/investment/data.html>

<sup>4</sup> TEN-T — Trans European Networks facility, managed by TEN-T Executive Agency.

<sup>5</sup> Other non-domestic sources for financing the road projects are EIB and World Bank loans and support from TEN-T financing instruments.

5. Planned Cohesion Policy funds' spending on roads totals around 65 billion euro for the two programming periods between 2000 and 2013<sup>6</sup>. According to an evaluation of the 2000–06 programming period, these funds co-financed almost 8 000 projects, which constructed around 75 000 km<sup>7</sup> of roads<sup>8</sup>.

<sup>6</sup> The average EU co-financing for the total costs of the projects audited was 44 %.

<sup>7</sup> Out of 75 000 km, 12 744 km were newly built and 62 256 km renovated roads.

<sup>8</sup> Source: 'Ex post evaluation of Cohesion Policy programmes 2000–06 co-financed by the European Fund for Regional Development', January 2010, Steer Davies Gleave, London ([http://ec.europa.eu/regional\\_policy/sources/docgener/evaluation/pdf/expost2006/wp5a\\_final\\_report\\_summary.pdf](http://ec.europa.eu/regional_policy/sources/docgener/evaluation/pdf/expost2006/wp5a_final_report_summary.pdf)).

TABLE 1

### PLANNED ROADS EXPENDITURE THROUGH COHESION POLICY FUNDS (MILLION EURO)

2000–06		2007–13	
Cohesion Fund	4 629	Cohesion Policy Funds	
ERDF	19 288		
of which:			
Motorways	4 416	Motorways	4 577
National roads	2 405	Motorways (for TEN-T network)	18 565
Regional/local roads	2 908	National roads	7 041
Roads (not specified)	9 558	Regional/local roads	10 581
<b>TOTAL</b>	<b>23 917</b>	<b>TOTAL</b>	<b>40 764</b>

Source: European Commission.

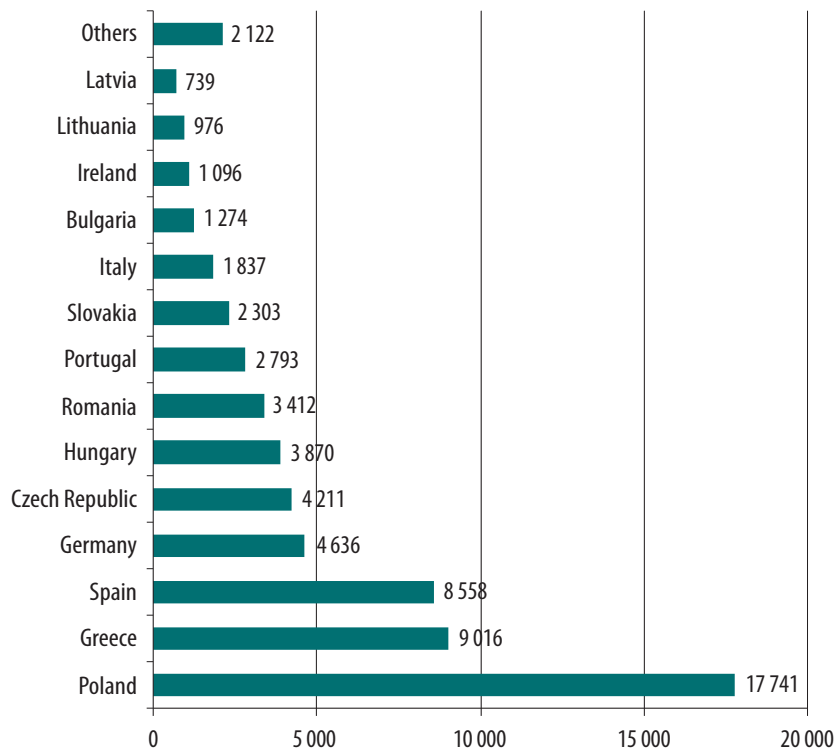
## AUDIT SCOPE

6. The Court carried out an audit addressing the main question: 'Have the EU Cohesion Policy funds' road infrastructure projects achieved their objectives at a reasonable cost?' The scope was further developed in two sub questions: (i) 'Did the road projects audited achieve their objectives?' and (ii) 'Were the projects managed to ensure reasonable costs?'.
7. The audit involved co-financed road projects in Germany (DE), Greece (EL), Poland (PL) and Spain (ES)<sup>9</sup>. These four Member States have the highest allocations of Cohesion Policy funding for roads in the period 2000–13 (see **Figure 1**), representing approximately 62 % of all EU road co-financing.

<sup>9</sup> In this field, the European Court of Auditors has already reported on EU co-financing of transport infrastructure (see Special Report No 1/93 on the financing of transport infrastructure (OJ C 69, 11.3.1993), Special Report No 8/2010 Improving transport performance on Trans-European rail axes: Have EU rail infrastructure investments been effective? and Special Report No 4/2012 Using Structural and Cohesion Funds to co-finance transport infrastructures in seaports: an effective investment? (<http://eca.europa.eu>)).

FIGURE 1

### BREAKDOWN BY COUNTRY OF PLANNED COHESION POLICY FUNDS' CO-FINANCING FOR ROADS BETWEEN 2000 AND 2013 IN MILLION EURO<sup>1</sup>



<sup>1</sup> The 'others' in the table are all other EU Member States except Luxembourg and Denmark that had no recorded roads-related spending.  
Source: Court calculations based on European Commission data.

8. A sample of three projects from the two operational programmes (OPs) with the highest spending on roads from each four selected Member States were included in the audit. The sample of 24 projects was drawn at random from a preselected population<sup>10</sup>. The audit covered motorways (10 projects), express roads (10 projects) and ordinary two-lane trunk roads (4 projects). The full list of the projects audited with a short description of their content and details of their cost is to be found in ***Annex I***.
  
9. The audit procedures included documentary review, interviews with the auditees, analysis of project management systems, experts' assessments and on-the-spot verification of project outputs and outcomes.

<sup>10</sup> The selection criteria were: the total project cost had to be more than 5 million euro, the projects had to be finalised and open to traffic and the projects should have at least one bridge. Half of the projects from each MS had to be ERDF Major Projects or Cohesion Fund projects.

# OBSERVATIONS

## THE ROAD PROJECTS AUDITED PARTLY ACHIEVED THE INTENDED RESULTS

- 10.** In order to analyse the performance of the road projects, the following criteria were considered by the Court:
- (i) establishment of transport infrastructure development objectives;
  - (ii) measurable impact on economic development, based on appropriate indicators;
  - (iii) economic viability of the investments made;
  - (iv) achievement of results regarding quantitative and/or qualitative improvements.

## THE ROAD PROJECTS HAD SET OBJECTIVES ...

- 11.** The defined objectives of road projects usually relate to national or regional economic development goals and interregional transport needs. At operational level the most common objectives are shorter transit times, increased road safety, reduced congestion and less pollution. Ways to achieve these goals include adding capacity and quality to the existing road network through building a new alternative connection (eight audited projects involved building a bypass), or in-depth renovation of the roads (seven audited projects).
- 12.** For 21 of the 24 projects audited the objectives had been set in terms of expected outcomes. For three projects, no needs analyses were conducted so they had been implemented based on common understanding among the decision-makers about the poor state of existing connections.

### ... BUT THEIR IMPACT ON ECONOMIC DEVELOPMENT COULD NOT BE ASSESSED ...

- 13.** In all ERDF Major or Cohesion Fund project applications for assistance<sup>11</sup> (11 projects audited) and in a further eight project applications the expected impact on economic development (such as the number of new jobs in the region, number of jobs due to the construction activity and maintenance, potential tourism activity) was described in detail. However, due to the lack of appropriate indicators (such as actual employment created, share of new transit traffic, number of new enterprises in the region), the reporting on the achievements of the projects focused on the amount of funding used and physical output delivered, with almost no information about the effects of the projects on the local economy or actual gains for road users. As a result, it is not possible to assess whether the funded projects actually generated the expected economic impact.

<sup>11</sup> These applications are subject to an ad hoc decision for co-financing by the European Commission.

<sup>12</sup> The exceptions were: road DK43 in the city of Częstochowa (PL), Keratea–Lavrio and Thessaloniki–Kilkis (EL), Jaraicejo (ES), road L132 (DE).

### ... AND MOST OF THEM DELIVERED LESS THAN THE PLANNED RETURN ON INVESTMENT ...

- 14.** For 19 of the 24<sup>12</sup> projects, economic viability analyses have been undertaken to assess whether the projects would deliver sufficient returns on investments. The indicators used included economic net present value (ENPV), economic rate of return (ERR) and the benefit–cost (B/C) ratio, the last of which was available for all 19 projects. This ratio depends on the estimated cost of the projects and on the estimated future economic benefits. For the other five projects, that were not major projects, the managing authorities did not consider the cost-benefit analyses necessary (for example Jaraicejo project (ES)) or there was no traffic forecasting available (for example Keratea–Lavrio project (EL)).
- 15.** There is no EU requirement for a minimum B/C ratio for EU co-financed road investments. Nevertheless the Commission has provided all managing authorities with 'A Guide to Cost-Benefit Analyses for Major Projects'.

16. Out of 19 projects for which information was available, 14 recorded less than expected usage<sup>13</sup> (see **Figure 3**). Also, on average the cost of the ERDF Major and Cohesion Fund projects audited turned out to be 26 % higher than the costs taken into account in feasibility studies<sup>14</sup>, making the investments much less economically viable than planned.
17. Two ERDF Major Projects (A17 and A20) audited in Germany were classified as 'urgent' in the federal road investment plan. Applying the actual figures, known after the projects were completed, to calculate the B/C of the projects, they do not classify as 'urgently needed', as the building costs increased by 50 % (A17) or the traffic volume was 50 % less than initially forecasted (A20).
18. Similarly, in Greece, according to the application for assistance, the B/C of the E75/PATHE corridor including the audited section was 3,1. The total cost of the project in the application for assistance was forecast to be 278 million euro. The actual cost of the project was 378 million euro. If all other factors had remained unchanged, the additional cost would have reduced the B/C to 2,3.

#### ... WHILE CLEARLY IMPROVING ROAD SAFETY AND HELPING TO SAVE TRAVELLING TIME

19. The improvements in road safety were set as an objective in all project applications. For two Spanish and one Greek motorway project the safety gains were especially noticeable. For the two projects audited on the motorway A66 (ES) the aim was to have the fatality rate not higher than 0,03 (number of dead persons per km per year) and the rate of injured persons not higher than 1,14. In 2010, the actual statistics showed the fatality rate to be zero and the injury rate only 0,1. The E75/PATHE (EL) project reduced the number of deaths from an average of six during the 2001 to 2010 period to zero. Further good examples for safety improvements are projects in the City of Częstochowa (PL) and Loja (ES) (see **Photo 1**) that solved persistent accident problems at railway level crossings.
20. The Court also tested the reduction in travelling times achieved by those 11 projects which had such an objective and/or for which comparative testing was possible. All tests proved that when compared to alternative connections, the road sections built delivered time gains of up to 60 %. All projects also delivered the time gains foreseen in the applications for assistance.

<sup>13</sup> Comparative analyses of available traffic information indicate reduction of traffic demand of up to 20 % in some of the audited countries in 2011 compared to 2010 but no such effect in earlier years. No significant changes in traffic demand were noted in Germany and Poland.

<sup>14</sup> The figure relates to the expected total costs of projects audited as presented in the applications for assistance.



© European Court of Auditors

**Photo 1 — New bridge in the town of Loja (ES) that resolved the road-level railway crossing problem and reduced the accident rate to zero.**

<sup>15</sup> A1, S8 and S7 (PL); Thessaloniki–Kilkis and Keratea–Lavrio (EL); S177 Pirna and B104 (DE).

- 21.** Although all audited projects achieved travelling time savings, seven projects<sup>15</sup> were not able to realise their full time saving potential as other parts of these transit routes did not provide the same speed, capacity and safety standards as the sections audited. Two of those (the road A1 (PL) and Thessaloniki–Kilkis (EL)) will be connected to roads of a similar type in the near future (the necessary projects were already ongoing at the time of the audit), but for the others issues remain (see the **Box** for details).

#### BOX

### THREE CASES OF POTENTIAL FURTHER IMPROVEMENTS FOR ADDITIONAL TRAVELLING TIME GAINS

- The road S7 (PL) will be completely renovated in the coming years but at the time of the audit was linked to a section with road-level crossings that slows down the traffic flow.
- The road S8 (PL) was a four-lane express road that at one end led into regular two-lane trunk roads, making the time savings on the express road section insubstantial. The full length of the road S8 from Bialystok to Wrocław is being upgraded.
- The road B104 (DE) is the second section of a northern bypass of Schwerin. The further parts of this bypass are not yet built.



## ENHANCED TRANSPORT CAPACITY COULD HAVE BEEN ACHIEVED AT LOWER COST

22. In order to evaluate the costs of the projects, comparative analyses were made by the Court based on input unit prices for the most comparable construction materials and works. When analysing the reasons for these costs, special attention was given to project management practices (planning, procurement and implementation) that are critical for delivering the projects with the most advantageous costs. As criteria the Court expected that the projects were properly delivered within the contracted time schedules and costs.

### DIFFERENT WAYS OF COMPARING THE COST OF ROADS

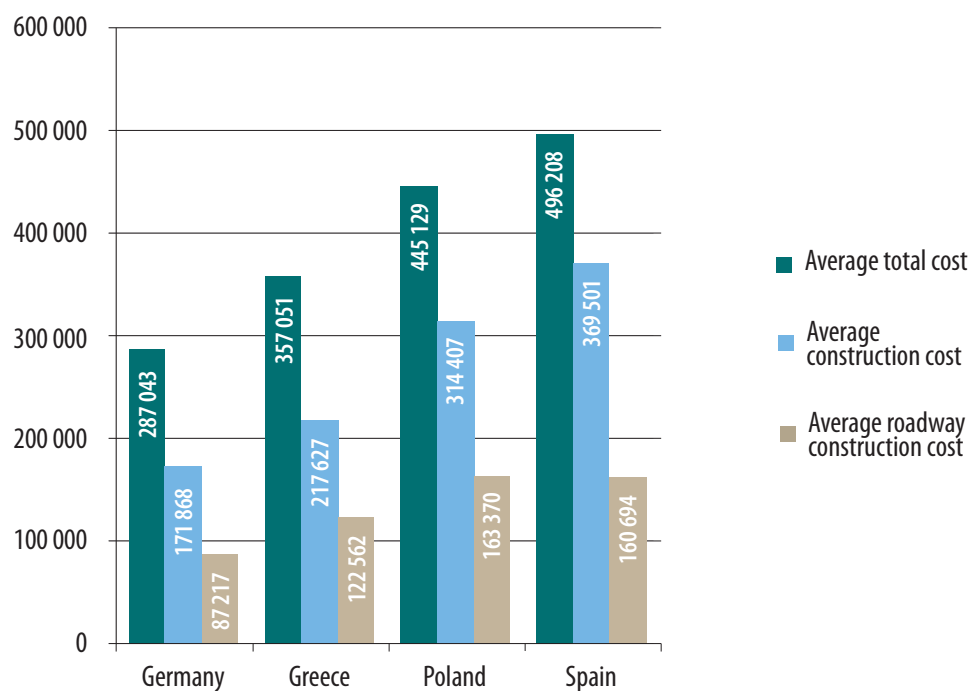
23. For all audited projects three cost categories were calculated by the Court:
- (a) Total costs of the project — the cost of a road per kilometre is easy to calculate but individual projects cannot be fairly compared using this measure as the geological and natural conditions and type of works can differ from one project to another. The figures for the total costs of projects can, however, be used to analyse different road types, for example the cost of building a motorway when compared to an express road.
  - (b) Total construction cost — total construction costs cover all materials and works needed to deliver the projects. When compared to total costs, such elements as supervision and land purchasing have been eliminated. Total construction cost indicates the price level in a country at which roads can be built.
  - (c) Roadway construction cost — this category only covers the costs of building the road surface and excludes planning and supervision, engineered objects and road accessories such as barriers and traffic signs. This category is the best to compare the costs of the projects with each other as all geological and nature-related cost elements have been eliminated.
24. In order to exclude the cost differences caused by the varying width of roads, all the costs have also been calculated per 1 000 m<sup>2</sup> of road surface. **Figure 2** presents the total cost, total construction and roadway construction costs per 1 000 m<sup>2</sup> of road surface. This figure gives a comparable overview of the cost levels of the projects included in the audit. Detailed information concerning the different type of costs on the project level can be found in **Annex II**.

**25.** **Figure 2** shows that:

- (a) the projects audited in Germany had the lowest cost per 1 000 m<sup>2</sup> in all three categories. There is no evidence that this can be explained by labour costs;
- (b) for the projects audited in Spain, there is considerable difference between the total construction and roadway construction costs. This indicates a heavy use of engineering objects such as bridges or tunnels;
- (c) the average roadway construction costs are the highest for the projects audited in Poland closely followed by projects in Spain.

**FIGURE 2**

**AVERAGE TOTAL COST, TOTAL CONSTRUCTION COST AND ROADWAY CONSTRUCTION COST FOR 1 000 m<sup>2</sup> OF THE ROAD PROJECTS AUDITED PER MEMBER STATE IN EURO<sup>1</sup>**



<sup>1</sup> For comparison of Polish projects long-term average exchange rate of 4 zloty = 1 euro was used for all calculations.  
Source: Calculation by the Court of Auditors.

- 26.** The cost of a road project can be influenced by (i) road alignment and need for land acquisition, (ii) technical specifications based on traffic forecasts and regulatory construction standards, (iii) procurement systems and the competitiveness of the market and (iv) project management during actual construction. In the following sections these factors are analysed on the basis of the audit results.

<sup>16</sup> S177 Radeberg (DE), A1 (PL), E75/PATHE and A2 Nymphopetra–Asprovalta (EL) A7 La Herradura (ES).

#### **THE ROAD PROJECTS MAINLY FOLLOWED THE MOST ECONOMICAL ROAD ALIGNMENT**

- 27.** For all 24 projects audited the Court verified whether the most economical road alignment had been chosen. For all projects alignment alternatives were checked and where possible the conditions were verified during the on-site visits.
- 28.** For 19 projects the reasons for the selected road alignments were sufficient to confirm their economic advantage. Five<sup>16</sup> projects were not built on the most economical alignment due to environmental constraints or opposition of local inhabitants/authorities. For example project E75/PATHE (EL) was built through difficult mountainous terrain in order not to block the access to the seaside in the towns of Kamena Vourla and Agios Konstantinos.
- 29.** Eight alignments followed previously existing roads. The remaining 16 greenfield projects were on average twice as expensive as the roads built on existing alignments as they involved the additional costs of land acquisitions and necessary earth works. The average total cost of the fully greenfield projects audited was 9,4 million euro per km while for roads using an existing alignment the average total cost was 4,7 million euro. Thus it is less costly to build on existing road alignments.

30. In one case, choosing the existing road alignment increased the cost. The S7 express road project (PL) turned out to be more expensive than the similar road S8 (PL), which was built as a greenfield project. In order to upgrade the road S7 to express road standards while maintaining roadside inhabitants' access, collecting roads<sup>17</sup> were needed along the entire length of the new express road.

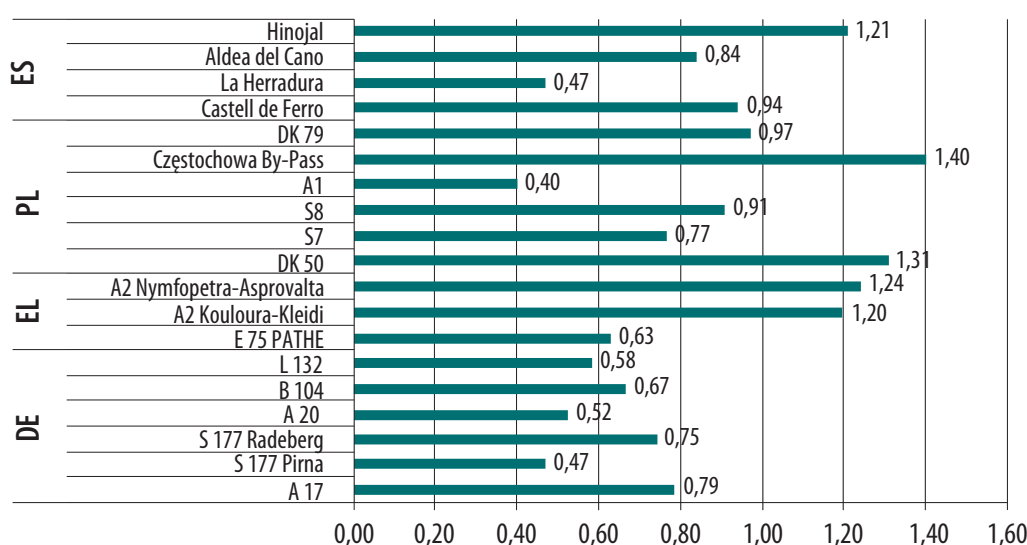
<sup>17</sup> A collecting road is a normal two-lane trunk road that collects the traffic to/from the properties that are by roads with entry barriers such as motorways and expressways.

#### TRAFFIC FORECASTS WERE IN THE MAJORITY OF CASES NOT IN LINE WITH ACTUAL ROAD USE

31. The design of the roads and the definition of their technical specifications are based on estimates of future traffic. The Court analysed the accuracy of traffic estimates for 19 projects for which both the planned and current traffic figures were available. For five projects the difference between actual traffic volumes and estimates was less than 20 %. In 11 cases it was between 21 % and 50 % and in three cases the difference was 51 % or more (four were underestimations and 10 overestimations) (see **Figure 3**, which compares the traffic forecasts with the actual traffic counting figures).

FIGURE 3

#### MEASURED AADT COMPARED TO THE FORECAST



Note: Value 1 means that actual and planned traffic are the same.

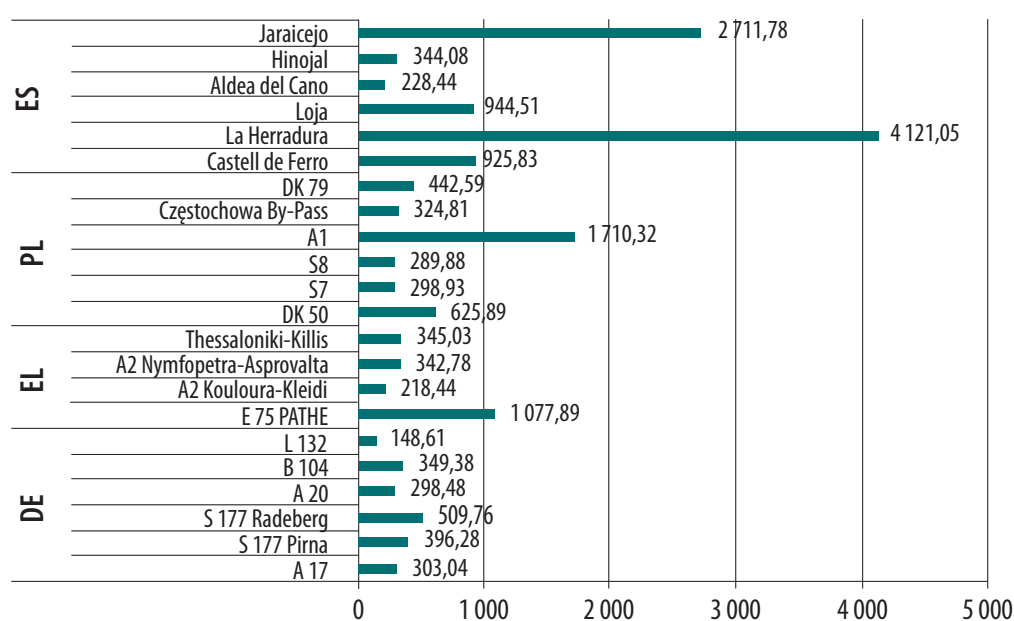
Source: Calculation by the Court of Auditors.

### COSTS PER USER VARY SIGNIFICANTLY

- 32.** The Court calculated the total cost of the projects by the measured AADT. This calculation that is presented in **Figure 4** is based on the information from traffic counting and presents the cost of one kilometre of road divided by the number of average daily users.
- 33.** The average cost in the projects audited of 1 km of road per AADT was more than four times higher in Spain than in Germany with Poland and Greece being in the middle between the two extremes.

FIGURE 4

### TOTAL COST OF 1 km OF AUDITED ROAD PROJECTS PER COUNTED TRAFFIC (AADT) IN EURO



Source: Calculation by the Court of Auditors.

34. La Herradura project (ES) had the highest cost per user. The project was technically complex and needed a lot of earthworks in order to complete the tunnels and the actual traffic was less than 50 % of the planned AADT. Other projects that have a significantly higher cost per daily user are either technically complex (including a high number of engineered objects such as bridges and tunnels<sup>18</sup>) or do not have much traffic<sup>19</sup>.

<sup>18</sup> Loja (ES), E75 Pathe (EL), DK50 (PL)).

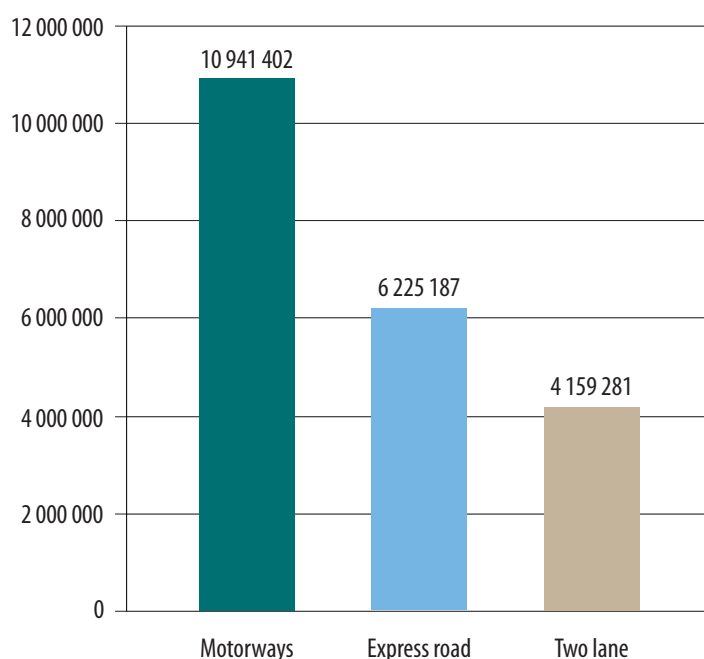
<sup>19</sup> Jaraicejo (ES), S17 Radeberg (DE), A1 (PL).

#### EXPRESS ROADS WERE CLEARLY LESS COSTLY TO BUILD THAN MOTORWAYS

35. The key technical decision that determines the future cost of the road results from the type of road to be built. In the Court's sample, the total costs of types of roads per kilometre is indicated in **Figure 5**. The full size motorways can be more than twice as costly to build as the two other road types.

FIGURE 5

#### AVERAGE TOTAL COST PER KILOMETRE FOR VARIOUS TYPES OF AUDITED ROADS<sup>1</sup> IN EURO



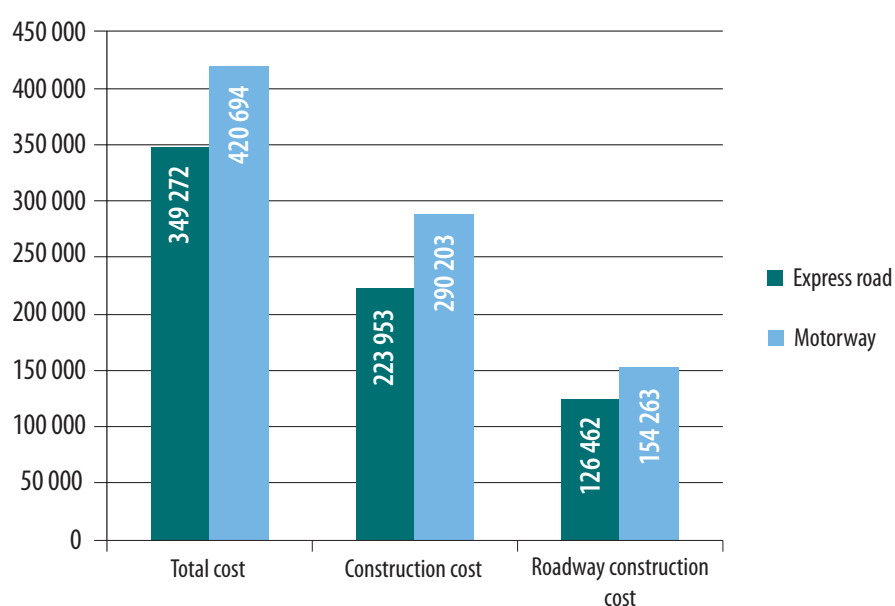
<sup>1</sup> Calculations based on total cost of the 24 projects audited.  
Source: Calculation by the Court of Auditors.

36. The Court calculated the average total costs, total construction costs and roadway construction costs for the two most comparable road types – motorways and express roads. **Figure 6** confirms that in all cost categories, express roads required less investment than motorways. The reasons for the difference in costs can be attributed to two main categories: (i) express roads need less width for the road corridors, so the cost for land purchase and construction is lower and (ii) existing alignments of ordinary trunk roads can be upgraded to express road standard because they are designed for lower speeds, while motorways usually require totally new road alignments<sup>20</sup>.

<sup>20</sup> The two green field Express Roads audited S8 (PL) and Thessaloniki – Kilkis (EL) had an average total cost of 4,2 million euro per kilometre. That is below the average cost per km for all express roads.

FIGURE 6

**AVERAGE TOTAL COST, CONSTRUCTION COST AND ROADWAY CONSTRUCTION COST PER 1 000 m<sup>2</sup> OF AUDITED MOTORWAYS AND EXPRESS ROADS IN EURO**



Source: Calculation by the Court of Auditors.

- 37.** As the express roads audited provide two carriageways with at least four traffic lanes, they are able to deal with a comparable number of vehicles providing similar safety standards as motorways. The audited express road projects had an average recorded AADT of 16 950 while eight comparable four-lane motorway projects recorded an average AADT of 13 398. Only in two cases did four-lane motorways record higher AADT than was the average AADT for express roads. This indicates that traffic on at least six motorways could be served also following express roads standards.



© European Court of Auditors.

**Photo 2 — Express road S8 in Poland**

#### **THE BEST POSSIBLE PRICE WAS NOT OBTAINED FOR ALL AUDITED PROJECTS**

- 38.** The Member States in the Court's sample had different procurement systems. In Greece and Spain the prices of construction input units were set by the administration and bidders offered discounts on the 'official' prices<sup>21</sup> and all future unit cost increases were covered by the 'cost plus' contracts. In Poland and Germany the offers were itemised and bidders were free to offer their prices for each input unit. In Germany, the road corridors were divided into shorter procurement units, of 1,5 to 5 km. In other audited countries, the projects were procured in one section<sup>22</sup>.

<sup>21</sup> In Spain the discounts were offered on the total price while in Greece the discounts were offered on the groups of works and materials.

<sup>22</sup> With the exception of E75/PATHE (EL) project, that was procured in two sections. In Poland and Greece major project management companies were awarded the large tenders due to high capital requirements set at the procurement phase.



39. In Greece and Spain the access to procurement processes was subject to prior registration in qualification registries<sup>23</sup> kept by the ministries of economy<sup>24</sup> while in Poland and Germany all companies can immediately take part in published procurement procedures.
40. For eight projects, the authorities awarded the contracts to bidders which had not offered the lowest price among the technically compliant bids. Three projects in Spain and four in Greece were procured using a mathematical formula that excluded companies making low offers (below 10 % of the average price offered). The practice of using mathematical formulas in Greece and Spain has been phased out. The Commission applied a 10 % penalty on all projects using this type of procurement in Greece. Some of the companies excluded from the procurement later formed joint ventures with the winning bidders<sup>25</sup>, provided the construction services and received payments based on the higher unit prices offered in the winning bid.

#### SIGNIFICANT COST DIFFERENCES EXIST FOR ROAD ACCESSORIES AND BRIDGE DECKS

41. Roads in Europe are built according to broad norms concerning the requirements for each road type but the specific regulations concerning the road accessories and markings are still fragmented. For example, the norms for road accessories such as road signs and some safety barriers are not standardised and, as a result, there are entrance barriers to the national markets. As a sign of progress a new harmonised European performance standard (EN01317-5) has been in force since 1.1.2011. The standard allows road authorities and manufacturers to express the product performance in a common European way. The designs of the barriers remain different from country to country so economies of scale are difficult to obtain. **Figure 7** presents the differences in price in different markets for a similar road safety barrier, showing that the difference between the lowest and the highest average price is 75 %.
42. As a specific cost item which can easily be compared, the Court also examined the cost of bridge decks in all projects audited. The results (see **Figure 8**) show that in Spain bridges cost significantly less than in the other countries audited.

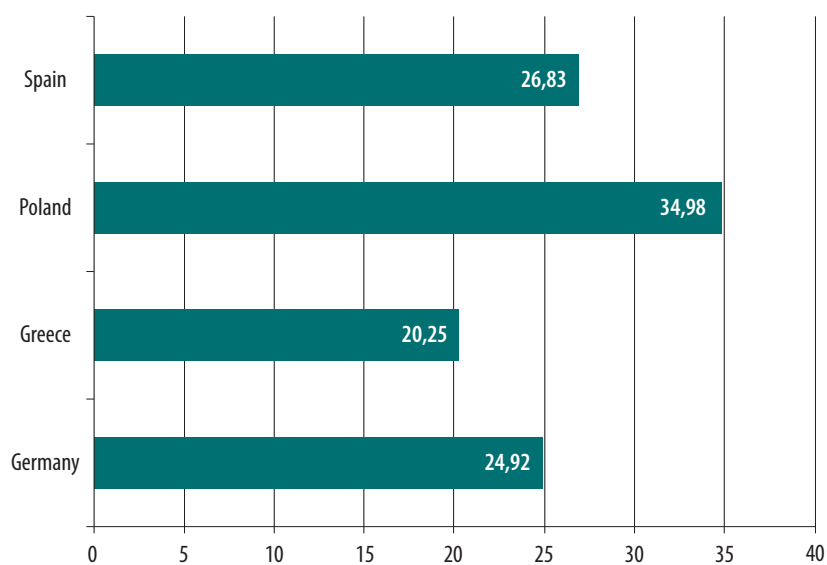
<sup>23</sup> Qualification registries keep the list of enterprises that are certified to undertake projects with a certain size or technical complexity. For each tendering process, a minimum qualification requirement is set.

<sup>24</sup> Registered companies can create joint ventures with other companies to carry out projects.

<sup>25</sup> This was the case in the Keratea–Lavrio and Kymis Avenue projects (both EL).

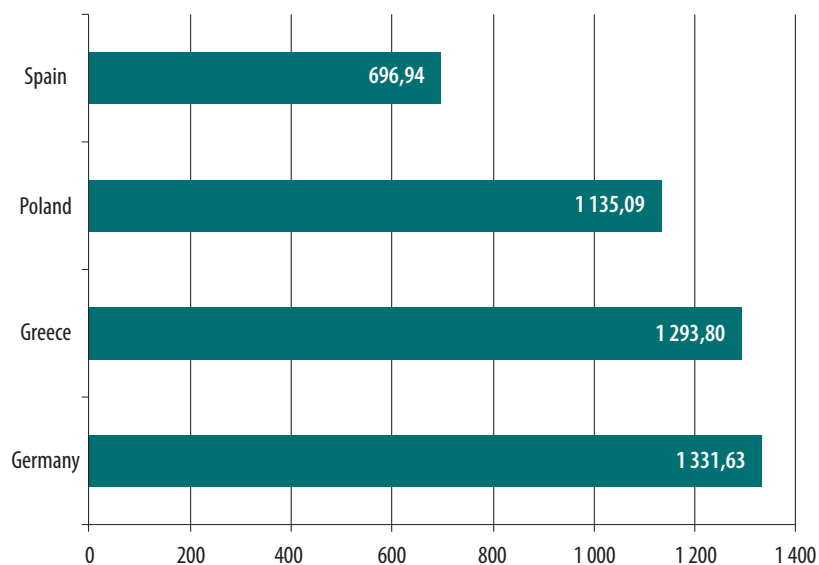
FIGURE 7

## AVERAGE COST OF 1 m OF SAFETY BARRIER OF AUDITED PROJECTS IN EURO



Source: Calculation by the Court of Auditors.

FIGURE 8

AVERAGE COST OF A BRIDGE DECK PER m<sup>2</sup> OF AUDITED PROJECTS IN EURO

Source: Calculation by the Court of Auditors.

**43.** In order to explain these cost differences, the Court compared the price of the core material for bridge construction, i.e. the price of concrete used. The comparative analysis (see **Figure 9**) shows that concrete is cheapest in the projects audited in Spain and rather expensive in Germany and Poland. The comparison of the cost of concrete indicates that the average price offered can be significantly lower in one Member State than in another<sup>26</sup>.

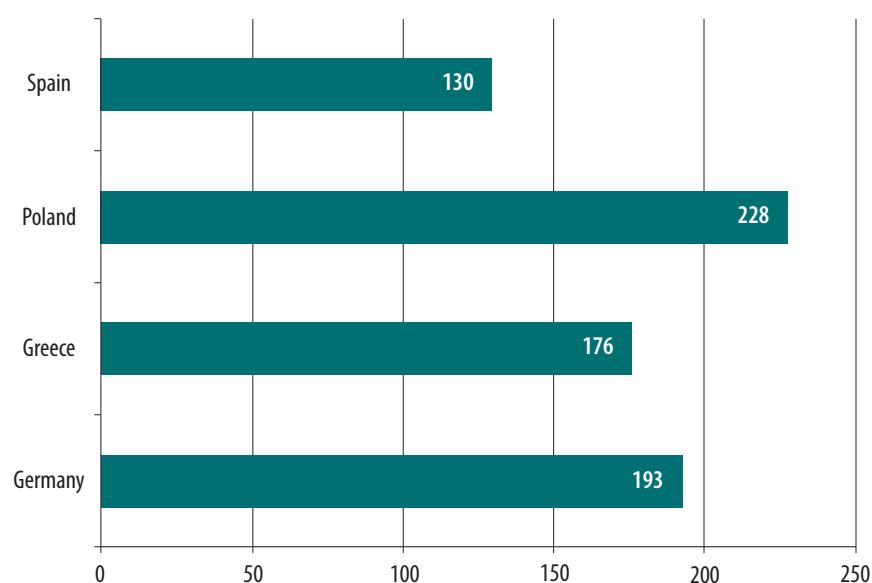
<sup>26</sup> The ingredients of concrete (cement, sand and steel) are internationally tradable, concrete itself not.

<sup>27</sup> A1 (PL); A17 and A20 (DE); E75/PATHE and A2 (EL); A7 (ES).

**44.** Six out of 10 motorway projects audited<sup>27</sup> included noise reduction elements. The required level of protection differs from one country to another. For example, the highest acceptable noise levels in Poland are lower than the corresponding values in neighbouring countries by up to 7 dB. The stricter rules make it necessary for a considerable part of nearly every new road project to be shielded by noise barriers (see **Photo 3**), which has an influence on the costs.

FIGURE 9

#### AVERAGE COST OF m<sup>3</sup> OF CONCRETE FOR THE BRIDGE DECK OF AUDITED PROJECTS IN EURO



Source: Calculation by the Court of Auditors.



© European Court of Auditors.

**Photo 3 — Sound barriers on DK 79 in the town of Jaworzno**

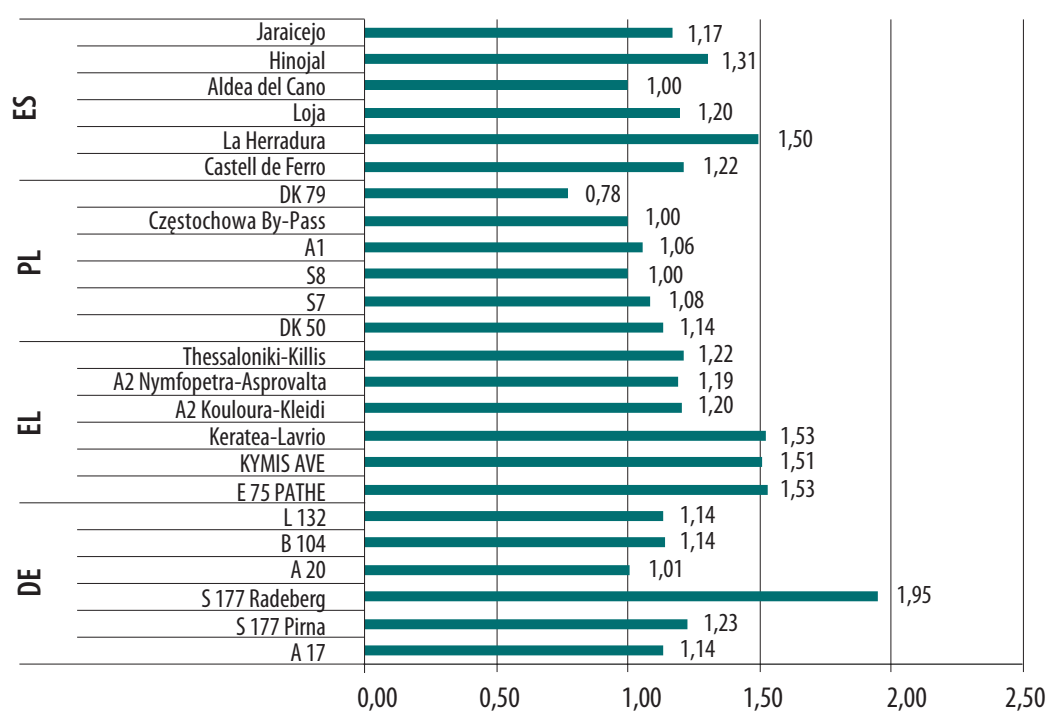
#### **COST OVERRUNS OF MORE THAN 20 % FOR 11 AUDITED PROJECTS**

- 45.** Different project management systems used in Member States have an impact on additional costs and timely delivery of the works. While in Germany and Poland the contractors have to bear the full responsibility for possible changes in the prices of inputs, in Greece and Spain indexing systems were used, whereby the input prices were periodically reviewed and revalued by the ministries of public works.
- 46.** In Greece, Germany and Spain remeasurements of works and contract updates were common leading to tens of modifications and additional payments. In contrast, the Polish project management system is designed to reduce any risk of additional claims and very few additional payments are made after the procurement.

- 47.** Out of the 24 projects audited, only seven were delivered at the original contract price (one in Germany, five in Poland and one in Spain). Moreover, the costs of 11 projects increased by more than 20 % during construction, mainly because of archaeological finds, planning mistakes, erroneous estimates in the documents concerning quantities and price indexing. A comparison of contract prices and the actual payments made is presented in **Figure 10**.
- 48.** The average additional payment for all projects after contracts had been signed was 23 %. The extremes were an increase of 36 % for the Greek projects and 1 % for the Polish ones.

FIGURE 10

### ADDITIONAL COSTS OF THE AUDITED PROJECTS IN RELATION TO THE CONTRACT PRICE



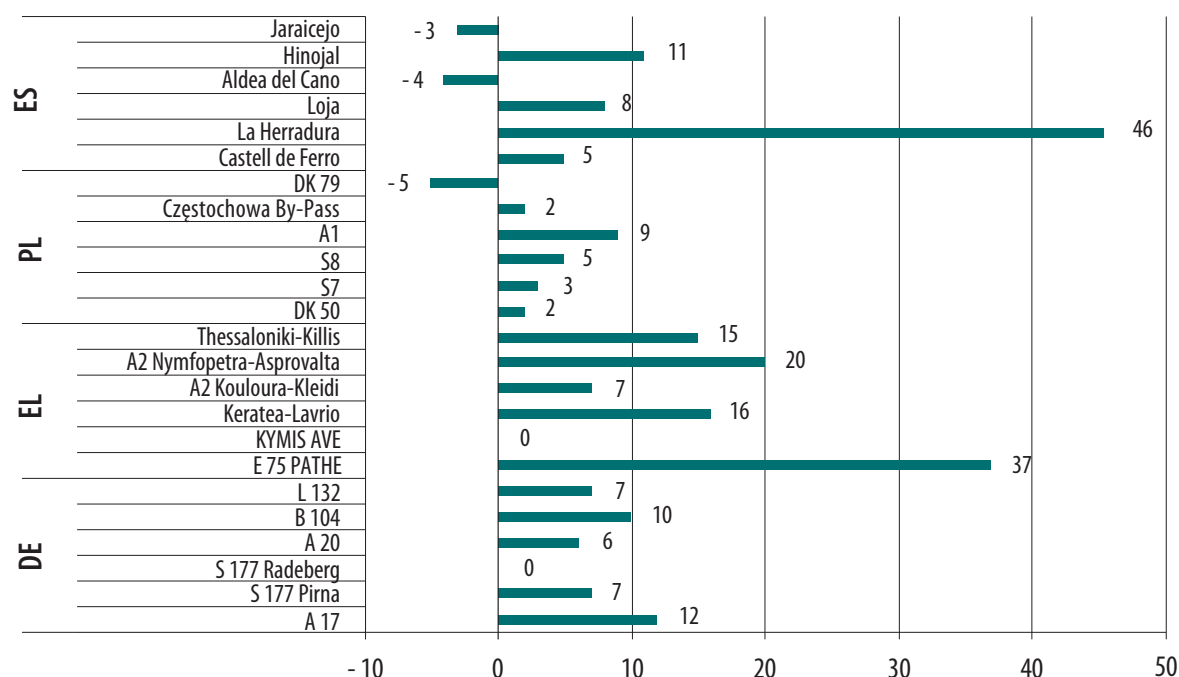
Note: The initial contract price equals 1.

Source: Calculation by the Court of Auditors.

49. Delays in road construction are commonplace. In countries where indexing systems were applied (Spain and Greece), the longer the extension of the construction period, the more advantageous it is for the contractors. Also long processes for land expropriations and problems with availability of working sites increased up to 1 year the duration of the project execution.
50. The average delay among the projects audited was 9 months or 41 % from the planned to the actual date of opening to traffic. In Poland, the average delay was 3 months or 16,5 % and in Germany 7 months or 59,5 %; for the projects in Spain, the average delay was 11 months or 31 % and in Greece roads were opened to traffic on average 16 months or 57 % later than expected (see **Figure 11**).

FIGURE 11

### DELAYS IN MONTHS OF THE AUDITED PROJECTS IN OPENING THE ROADS TO TRAFFIC



Source: Calculation by the Court of Auditors.

# CONCLUSIONS AND RECOMMENDATIONS

## DID THE ROAD PROJECTS AUDITED ACHIEVE THEIR OBJECTIVES?

51. The EU spent some 65 billion euro on road investments between 2000 and 2013. All the projects audited added capacity and quality to the road networks and resulted in travelling time savings and improved road safety. However, the economic development objectives were not measurable and there is no information available on the impact of the projects on the local or national economy.
52. The actual economic viability calculated using a Benefit/Cost ratio based on the actual cost and use was significantly lower for half of the projects when compared to the assumptions made in the planning phase with significantly lower costs and/or higher traffic.

## WERE THE PROJECTS MANAGED TO ENSURE REASONABLE COSTS?

53. Insufficient attention was paid to ensuring cost-effectiveness of the projects:
  - (a) Most of the audited projects were affected by inaccurate traffic forecasts. Only four out of 19 projects for which sufficient information was available carried volumes of traffic which were in line with forecasts.
  - (b) The type of road chosen was not best suited to the traffic it carried: motorways, costing much more than express roads (the average total cost per km is around 11 million euro for motorways and 6,2 million euro, i.e. 43 % cheaper, for express roads), were the preferred option of construction, even for sections where express roads could have solved the traffic needs.
  - (c) During the project implementation the projects audited became more expensive and were affected by delays as the average increase to the original contract price was 23 % and time overruns averaged 9 months or 41 % of the planned time.

- 54.** Furthermore the Court notes that projects in two Member States were procured using a mathematical formula that excluded bidders making offers below 10 % of the average offered price. The Commission applied a 10 % penalty on payments to the abovementioned projects where such a formula was used. The Court notes that this kind of procurement practice has been phased out.
- 55.** Among the projects audited, the cheapest roadway construction costs were found in the projects audited in Germany, followed by Greece, Spain and Poland. There is no evidence that this can be explained by labour costs. The lowest average cost per actual use was recorded in Germany, followed by Greek, Polish and Spanish projects. The cost per user is on a scale of 1 to 28 times more between the road with the best and that with the worst ratio (or a scale of 1 to 12 times if two extreme cases are taken out).

#### RECOMMENDATION 1

The Commission should analyse the differences in roadway construction costs between the Member States in order to identify the causes of significant price differences thereof and assure that the best practices are applied in future.

#### RECOMMENDATION 2

The future co-financing of road projects should be made conditional upon:

- (a) the existence of clear objectives that are accompanied by indicators such as for travel time savings, gains in road safety, capacity improvements and concrete effects on the economy;
- (b) the use of reasonable and cost-effective technical solutions that are in line with the best practices identified, including for the accessories required for road construction.
- (c) steps taken by the Member States to ensure competition in construction markets, focusing procurement systems on delivering the best value for money while avoiding entrance barriers such as for example broader international publicity for the tender processes, recognition of quality categories of companies provided in other Member States and easing SMEs' access to procurement procedures.



**RECOMMENDATION 3**

The Commission should promote the exchange of best practices between national road administrations concerning reliable traffic forecasts.

**RECOMMENDATION 4**

The Commission should consider: the establishment of European Union-wide unit cost information for engineers preparing estimates for new projects, in order to help the beneficiaries lower the procurement prices.

This report was adopted by Chamber II, headed by Mr Harald NOACK, Member of the Court of Auditors, in Luxembourg at its meeting of 29 May 2013.

*For the Court of Auditors*



Vítor Manuel da SILVA CALDEIRA  
*President*

## ANNEX I

## OVERVIEW OF AUDITED PROJECTS

Country and region	Name of the project	Total cost (euro)	EU co-financing (euro)	Traffic volume as AADT <sup>1</sup>	Short description of the project
<b>GERMANY</b> Saxony	Motorway A 17 from Dresden to the Czech border (40,8 km)	655 510 000	277 600 000 (42 %)	51 100	Major road artery that connects Germany to Czech Republic. The thoroughly audited section was 3,88 km Construction Segment 1.2a.
	Express road S 177 Western Bypass at Pirna (3,7 km)	20 700 000	15 600 000 (75 %)	12 000	Bypass of the town of Pirna. Part of a future link between motorways A 17 and A 4. The thoroughly audited section was 1,5 km Construction Segment 5.2.
	Express road S 177 Bypass at Radeberg (6,2 km)	38 000 000	28 500 000 (75 %)	12 000	Bypass of Grosserkmannsdorf–Radeberg. Part of a future link between motorways A 17 and A 4. The thoroughly audited section was 3,2 km Southern Construction Segment.
<b>GERMANY</b> Mecklenburg and Western Pomerania	Motorway A 20 Grimmen-East to Strasburg (91,2 km)	367 600 000	25 100 000 (6,8 %)	12 662	Part of the Baltic Motorway, from Lübeck to Szczecin in Poland. The thoroughly audited section was 12,4 km from Jarmen junction to Anklam junction.
	Express road B 104 Northern Schwerin Bypass (7,5 km)	32 000 000	19 000 000 (65 %)	No information available	Important element in the renovation of the European road E 22. The thoroughly audited section was 5,5 km Schwerin urban bypass, Construction Segment 5.
	State road L 132 Niendorf — Rostock (1,5 km)	5 178 000	3 874 000 (75 %)	10 000	Connection between the A 20 motorway and the southern part of the town of Rostock. Construction Segment 3.

<sup>1</sup> As provided by the road authorities at the time of the audit.

Country and region	Name of the project	Total cost (euro)	EU co-financing (euro)	Traffic volume as AADT <sup>1</sup>	Short description of the project
<b>GREECE</b> <b>Attica</b>	Motorway E75/PATHE section Agios Konstantinos–Kamena Vourla (20 km)	378 806 726	146 062 798 (39 %)	15 283	Part of Greece's most important north–south transit route. The thoroughly audited section was the 9 km motorway section Kamena Vourla. The works were delayed due to difficult mountainous building conditions.
	Express road Kymis Avenue from Kifissias junction to Olympic village (6,6 km)	75 822 106	22 877 923 (30 %)	No information available	Connection between the 2004 Athens Olympic village and the motorway E75/PATHE. The road continues to the municipality of Tharkomakedones. In future the road should be directly connected to Athens' ring road.
	Express road S89 Stavros–Lavrio, section Keratea–Lavrio (12,9 km)	18 395 555	7 994 920 (43 %)	No information available	Upgrade of two lane road into four-lane express way that connects Athens ring road to the port of Lavrio. The project saw delays due to the bankruptcy of the main contractor.
<b>GREECE</b> <b>Central Macedonia</b>	Motorway A2 Egnatia Odos, section Kouloura–Kleidi (25,14 km)	59 309 257	24 904 493 (53 %)	21 600	Upgrade of two-lane road into four-lane motorway. Part of the east–west transit route Egnatia Odos.
	Motorway A2 Egnatia Odos, section Asprovalta–Nymphopetra (31 km)	184 095 172	77 095 200 (42 %)	15 500	New motorway section on Egnatia Odos. Missing section, as both ends were already constructed.
	Express road Thessalonica–Doirani, section Nea Santa to Mavroneri (11,3 km)	31 327 495	25 200 000 (80 %)	8 000	Middle section of express road linking Thessalonica area to Kilkis. The potential continuation of the connection to FYROM remains uncertain.

Country and region	Name of the project	Total cost (euro)	EU co-financing (euro)	Traffic volume as AADT <sup>1</sup>	Short description of the project
<b>POLAND</b> <b>Masovia</b>	Arynow bypass on a road DK50 (1,942 km)	12 481 450	7 921 600 (63 %)	11 800	The project was a continuation of the renovation of the road DK50, as the first part was co-financed by the World Bank. The project created crucial connection between the DK 50 and National Road No 2.
	Express Road S8, section Radzymin–Wyszkow, including Wyszkow bypass (28,336 km)	216 444 000	140 197 790 (83 %)	19 701 <sup>2</sup>	A new greenfield express road that leads from Warsaw towards north-eastern Poland. The road continues as an ordinary two-lane trunk road. Thoroughly adited section 12,8 km bypass of Wyszkow.
	Express Road S7 section Bialobrzegi–Jedlinsk (13,652 ikm)	118 022 250	85 257 005 (72 %)	24 837 <sup>3</sup>	Upgrade of national road to express road standards. Continuation of previous projects on the same road. Includes collecting roads for local traffic.
<b>POLAND</b> <b>Silesia</b>	Motorway A1, section Sosnica–Belk (15,411 km)	307 887 511	193 803 465 (63 %)	9 374 <sup>2</sup>	First section of a new motorway that connects Central Poland to Czech Republic. Out of the audited sample of 24 projects the A1 was the only one awarded to a non-domestic bidder.
	National Road nr 43 in the city of Częstochowa (1,4 km)	14 028 195	9 401 244 (67 %)	31 525	New bridge over the railway tracks and large upgrade of the national oad in the territory of Częstochowa.
	National Road nr 79 in the city of Jaworzno (2,92 km)	16 880 016	761 766 (4,5 %)	12 900	New alignment of the road DK in the city of Jaworzno, bypassing the transit traffic from the city centre. Was procured as a lump sum contract though no unit cost information is available.

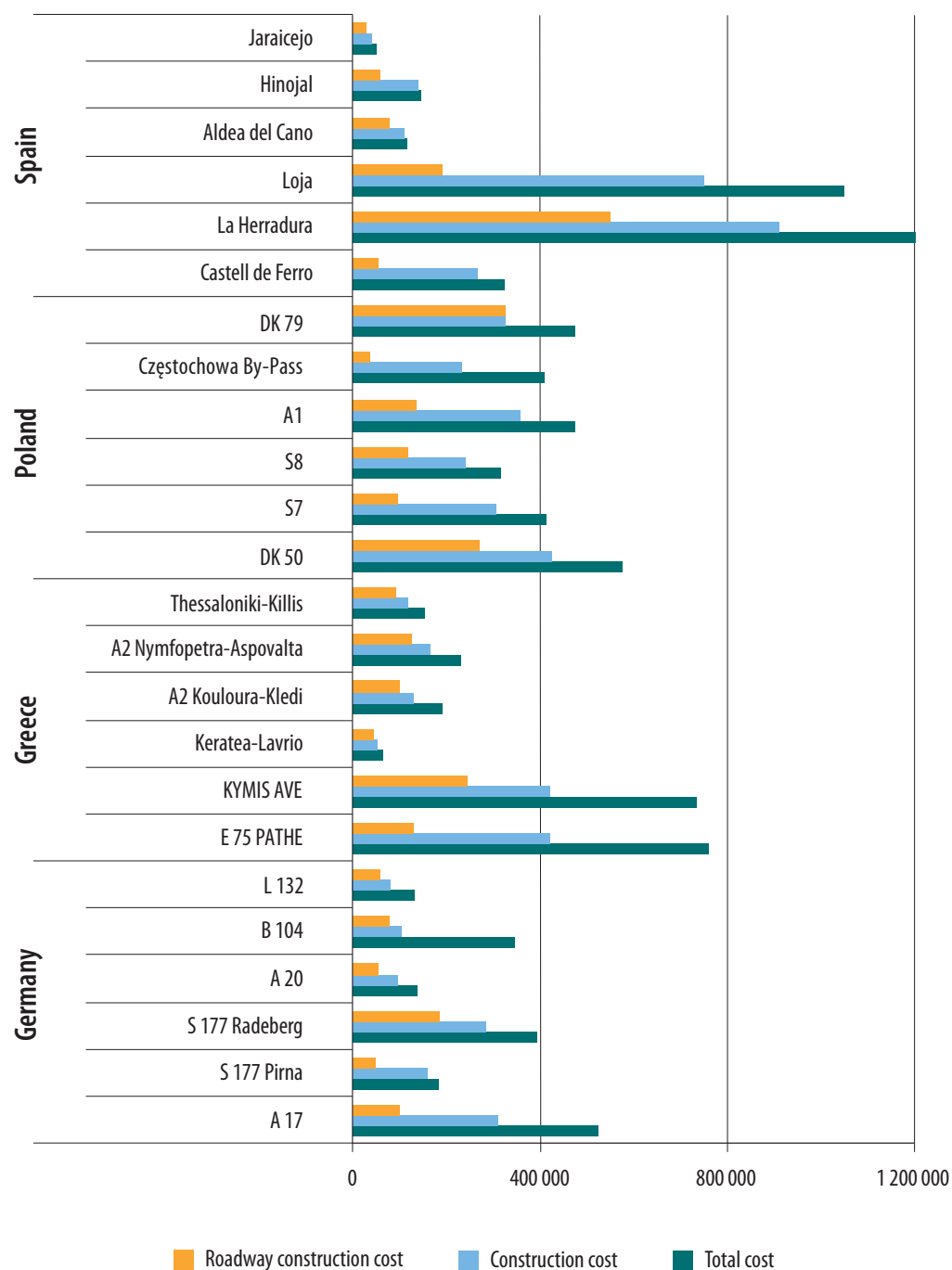
<sup>2</sup> Average of the results of three measuring points.

<sup>3</sup> Average of the results of two measuring points.

Country and region	Name of the project	Total cost (euro)	EU co-financing (euro)	Traffic volume as AADT <sup>1</sup>	Short description of the project
<b>SPAIN</b> <b>Andalucia</b>	Mediterranean Motorway A7 section Tramo Castell de Ferro–Polopos (3,6 km)	28 174 391	17 891 652 (64 %)	8 472	Section of the new Motorway A7 from Algeciras to Barcelona. Used the alignment and part of the roadway of an existing national road.
	Mediterranean Motorway A7 section La Herradura–Almunecar (9,12 km)	280 150 747	108 939 032 (39 %)	7 454	Section of the new Motorway A7 from Algeciras to Barcelona. The road is on one end not connected to a motorway, although the construction was ongoing at the time of the audit.
	New bridge over the river Genil and a railroad overpass in the town of Loja (1,68 km)	6 850 627	3 925 293 (57 %)	8 889	A new (second) bridge was built into the town of Loja over the river Genil and a same level railway pass was upgraded into an overpass.
<b>SPAIN</b> <b>Extremadura</b>	Motorway A66 section Caceres North–Aldea del Cano (29,343 km)	96 689 964	58 896 574 (67 %)	10 690	Section of the new motorway from northern Spain to Seville, in the south.
	Motorway A66 section Enlace de Hinojal–Caceres North (21,422 km)	88 065 756	50 841 178 (58 %)	12 594	Section of the new motorway from northern Spain to Seville, in the south.
	Ronovation of the Local Road EX – 385 in Jaraceijo (14,617 km)	6 104 166	4 135 445 (68 %)	154	Upgrade and partly new built local road that enhanced the accessibility to the Manfragüe Wildlife Protection National Park.
<b>TOTAL</b>		<b>3 058 523 384</b>	<b>1 355 781 378 (44 %)</b>		

## ANNEX II

### COMPARISON OF TOTAL COST, CONSTRUCTION COST AND ROADWAY CONSTRUCTION COST OF THE PROJECTS AUDITED PER 1 000 m<sup>2</sup> (IN EURO)



# REPLY OF THE COMMISSION

## EXECUTIVE SUMMARY

### III and IV.

The Commission welcomes the result of the audit that shows that roads delivered results in terms of travelling time savings and safety, which are important objectives for road infrastructures.

Transport is a derived demand and has a strong link with the economic situation. The economic slowdown and crisis, as well as external factors, such as the fuel price, might have affected both the level and the composition of traffic flows. Seasonal peaks might also have an impact (tourist flows for instance).

Road infrastructure projects have an expected lifetime of approximately 30 years. Traffic flows should be ideally evaluated over this period and for the whole lifetime, and not only on the first few years of usage. Traffic forecasts take this longer perspective into consideration.

Cohesion policy is implemented under the principle of shared management and subsidiarity. In this context a Member State has the possibility and the first responsibility to opt for a certain type of road against another. Furthermore, the Member State's decision on the 'type' of investment ('express road' or 'motorway') does not only depend on its cost. It also depends on the long-term infrastructure planning of this Member State and the macro-economic effects of that investment (and the entire network being developed) on the whole region/country.

In addition, the roads built may have had different characteristics and initial completion time schedules. Difficult geomorphological conditions, complexity of project design and construction, number and position of engineering objects, environmental aspects, etc. should also be taken into account when assessing the delivery of projects.

## REPLY OF THE COMMISSION

### V.

Demand forecasts and therefore the related cost per use take into consideration the very specific context of the regions. In regions lagging behind, where depopulation is a recent trend, the building of new roads is often a measure to improve the accessibility of such remote areas ('*désenclavement*'), since the road's objective is to serve as an incentive with an effect over time. Hence, in such regions, it is normal that for a certain (usually short) period the number of average daily users is low.

Furthermore, the accessibility of infrastructure also has effects in terms of workers mobility and impacts on the unemployment rates in less populated regions, but with better accessibility.

### VI. (a)

The Commission agrees with this recommendation and considers it as partly implemented. It has indeed already undertaken several unit cost studies in recent years and will continue to do so. It will in particular update the Commission's guide on cost-benefit analysis for the next programming period for the benefit of all types of projects included under co-financed programmes. In their assessment of major projects in the current programming period the Commission checks unit costs in comparison to other similar projects and raises questions where additional justification is required. JASPERS<sup>1</sup> in their work with major projects look into unit costs and compare them with unit costs in other projects in the sector as well as other international practice.

### VI. (b)

The Commission agrees with this recommendation and considers it as partly implemented.

The Commission shares the view that road projects should have clear objectives accompanied by appropriate indicators. Indeed, in the current period this information is required as part of major projects' description, as well as in the cost-benefit analysis. The selection of reasonable and cost-effective technical solutions is considered as part of the feasibility study and option analysis carried out for each major project which should result in selecting the best solution. Member States are expected to apply the same principles on non-major projects, for example through the selection criteria. The Commission proposal for the Structural and Investment Funds for the next programming period contains a comprehensive performance framework and conditionality which if adopted, will help in ensuring that future road projects will contain clear objectives accompanied by indicators.

The Commission will consider methods of sharing best practices in the field, for example through the use of JASPERS know-how.

The EU directives on public procurement aim at ensuring the principles of fair and open competition throughout the EU, equal treatment of all economic operators without giving undue advantages or creating barriers, obtaining the best value for public money, etc. The Commission, as guardian of the Treaties, ensures that Member States, which are primarily responsible for the application of EU law, transpose the procurement directives into their national legal framework and provide remedies in case its procurement entities would fail to respect that body of law.

Co-financing from Cohesion Policy is subject to conformity with the principles of EU directives on public procurement and EU policies. The Commission monitors that these are implemented in practice. For the next programming period, *ex ante* conditionality linked to public procurement is foreseen.

<sup>1</sup> Joint Assistance to Support Projects in European Regions. JASPERS is a partnership between the European Commission (Directorate-General for Regional and Urban Policy, the European Investment Bank (EIB), the European Bank for Reconstruction and Development (EBRD) and the Kreditanstalt für Wiederaufbau (KfW). It is a technical assistance facility for the 12 EU Member States that joined the EU in 2004 and 2007. It provides them with the support they need to prepare high quality major projects, which will be co-financed by EU funds.



## REPLY OF THE COMMISSION

### VI. (c)

The Commission's Guide to cost-benefit analysis of investment projects, which applies to all projects, gives guidance on carrying out traffic forecasts. The Commission will also invite JASPERS to consider this topic for planning their future networking platform meetings with Member States to promote the exchange of best practices.

### VI. (d)

The Commission acknowledges the need for making available more detailed unit costs information and will consider the issue in the update of the Commission's Guide to Cost Benefit Analysis for the next programming period.

## OBSERVATIONS

### 13.

The impact assessment has to be combined with evaluations to explore the mechanisms of change, as well as other factors which play a role in the economic environment (such as economic cycles, disposable income, transport trends, development of other transport modes, etc). In addition, the impact on economic development may depend on completion of a network of roads and other transport modes, rather than one project.

### 14.

The Spanish Jaraicejo project can be considered a minor (eligible costs of only EUR 5,8 Million) and non-revenue-generating project. According to the Spanish legislation a CBA was not obligatory for this size of project.

### 16.

The economic downturn may have had an impact on traffic. In addition, road infrastructure projects have an expected lifetime of approximately 30 years. Thus, their return on investment should be based on traffic data for the whole lifetime and not only on the first few years of usage (up to 2010), which may indeed prove more limited than the forecast.

### 17.

In Germany the classification of projects as 'urgent' is defined in a federal plan which is then fixed by law on the basis of several criteria. However the CBA report must always provide a B/C ratio above 1.

### 18.

Even with this lower B/C ratio, the decision to finance the project would not have been reversed, because the Greek authorities consider a B/C ratio of 1,2 to be sufficient for approval of financing of projects. This proves the positive socioeconomic value of the project.

### 19.

The Commission welcomes the Court's positive conclusion. It considers that contribution to road safety should be better highlighted including the reduction on fatalities and seriously injured. Better quality of road infrastructure delivers a reduction in the number of accidents and in the severity of injuries.

Other appropriate means to verify the safety of road infrastructure are the results of road safety audits during the construction and road safety inspections for sections already in operation.

### 25. (b)

The considerable difference between the general construction and the roadway construction costs are attributed to the extensive use of engineering objects. For instance for the Herradura project, three tunnels, four bridges and three underway passes were needed in a short distance. Comparison of the general construction and roadway construction costs without this project would give similar figures for Spanish projects.

## REPLY OF THE COMMISSION

### 25. (c)

In the case of Spain, the extremely complex geological characteristics of the location of two chosen projects: La Herradura and Castell de Ferro-Polopos might contribute to high roadway construction costs.

In Poland, as reasons for the higher costs of road construction one could mention the significant increase of costs of materials (30 %–40 % in the last 5 years), the extensive investment programme launched by Poland which overheated the market and the particular geological conditions in certain cases.

### 30.

The upgrading of expressway S7 included approximately 40 engineering objects, which justifies the increased costs in comparison to similar projects.

### 31.

Transport is a derived demand and has a strong link with the economic situation. The economic slowdown and crisis might have affected both the level and the composition of traffic flows, which should be carefully assessed such as the percentage of lorries, buses, motorbikes, etc. External factors, such as the fuel price, might have an influence on transport choices and on the AADT of the project. Seasonal peaks might also be evaluated (tourist flows for instance) if appropriate.

In addition, road infrastructure projects have an expected lifetime of approximately 30 years. Thus, the traffic flows should be ideally evaluated over this period and for the whole lifetime, and not only on the first few years of usage. Traffic forecasts take this longer perspective into consideration.

### Common reply to paragraph 32 and 33

In order to have a complete picture, it is important to have in mind that usually demand forecasts and therefore the related cost per use take into consideration the very specific context of the regions. In regions lagging behind, where depopulation is a recent trend, the building of new roads is often a measure to improve the accessibility of such remote areas (*'désenclavement'*), since the road's objective is to serve as an incentive with an effect over time. Hence, in such regions, it is normal that for a certain (usually short) period the number of average daily users is low.

Furthermore, the accessibility of infrastructure also has effects in terms of workers mobility and impacts on the unemployment rates in less populated regions, but with better accessibility.

This analysis also depends highly on the geographical circumstances under which the audited roads were built. Technically more complex roads have higher costs per km than other roads.

### 34.

For the La Herradura project (Almuñecar), three tunnels, four bridges and three underway passes were needed in a short distance. The extremely complex geological characteristics of the location of Herradura project increased the costs (see also Commission reply to paragraph 25(b) and (c)). Furthermore, the forecast of traffic for the Herradura project in 2010 did not take into consideration the economic crisis which has reduced the planned AADT by more than 20 %.

## REPLY OF THE COMMISSION

### 35.

Cohesion policy is implemented under the principle of shared management and subsidiarity. In this context a Member State has the possibility and first responsibility to opt for a certain type of road against another. All options are potentially acceptable under the condition that the co-financed projects have a positive socio-economic impact and their selection is in line with the programming documents adopted in consultation with the Commission.

In addition, a Member State's decision on the 'type' of investment ('express road' or 'motorway') does not only depend on its cost. It also depends on the long term infrastructure planning of this Member State and the macro-economic effects of that investment (and the entire network being developed) on the whole region/country.

Whilst 'express roads' generally aim at connecting local/regional villages/towns/cities, 'express motorways' aim at connecting several big agglomerations and at increasing:

- (a) workers mobility;
- (b) accessibility of a region to the investors.

### 37.

The Commission refers to its reply in paragraph 35.

### 40.

The exclusion of abnormally low offers is in line with public procurements rules, as far as the exclusion of an offer is not made automatically and each candidate has been given the possibility to explain the reasons that allowed the offer of a lower price (see point 73, case Lombardini (C-285/99)).

Having phased out the procurement system based on the mathematical formula, in Spain currently the winning bid is not only chosen because of being the lowest financial offer. There are other criteria, such as quality, execution deadline, environmental requirements, functional characteristics of the works, the availability and cost of replacements, etc.

Due to the financial correction applied by the Commission for the use of mathematical formulas in Greece and the subsequent phasing out of this practice, the risk of providing services based on higher unit prices by excluded companies within joint ventures is reduced.

### 41.

The European standard (EN01317-5) that allows road authorities and manufacturers to express the product performance in a common European way ensures the internal market for road barriers.

The road authorities which need to install new safety barriers have now the obligation (under Directive 2004/18/EC) to express their requirements on the basis of the above European standard and any manufacturer whose product has the performance required by the road authority should be able to submit an offer.

Procurement entities which need to buy safety barriers covered by standard EN01317-5 for new road sections or in order to replace parts of damaged existing barriers (for maintenance or for repair) are expected to refer in their tender specifications to barriers which are CE marked and which have the necessary performance and geometric details to ensure performance and aesthetic compatibility with the already installed barrier. The Commission considers that due to this standardisation, this fragmentation of the European public market will cease to exist and producers of such safety barriers will be able to rely on the same technical specifications when tendering in any of the Members States, thereby profiting from economies of scale.

## REPLY OF THE COMMISSION

**44.**

Member States are responsible for ensuring that proportional arrangements are made for noise protection depending on the traffic density and subsequent noise levels. According to the European Environmental Noise Directive 2002/49/EC Member States are required to adopt action plans for roads where traffic amounts to more than 6 million vehicles per year. Local residents must be consulted on these action plans.

**45.**

The Commission, under the principle of subsidiarity, cannot oblige a Member State to use a particular management system or another, but it can raise awareness amongst the Member States, procuring authorities on the best practices across EU Member States.

Although in Germany and Poland contractors are responsible for future changes in the prices of inputs, in Spain the indexation procedure is more complex and the law allows the review and re-evaluation of input prices.

Price reviews in Spain are applicable in works contracts that run for more than one year and where the execution rate exceeds 20 %.

Concerning Greece, the indexation is done on a quarterly basis and on well-established categories that are known in advance. The unknown factor is the inflation on the materials and the price of work.

**46.**

For the six Spanish projects the average number of modifications and complementary contracts is approximately three per project. The average of the over expenditure is approximately between 20 %–30 % of the initial value of the project. Modifications and complementary contracts are justified by unforeseen circumstances.

Concerning Polish projects, financial corrections were made in the past for unjustified additional works and contract modifications. It is important to find a balance between accepting a certain level of flexibility and being adequately strict to avoid abuse.

In Greece, the unforeseen circumstances related to the country's geomorphology created delays on the E75 PATHE project. Furthermore, delays are often due to judicial procedures, appropriation questions and the constant involvement of the archaeological service.

In Germany, EU funding was generally capped and subsequently cost increases were paid by the Member State alone. These overruns did not affect the EU budget.

**49.**

In Spain, the national law allowed in 'unforeseen circumstances' cases modifications and complementary contracts, creating delays in the finalisation of the works. This was common in the sample chosen and may have been an economic advantage for the contractors.

Concerning Greece, the national authorities have taken and are taking measures to increase administrative capacity and to reduce red tape and delays in the functioning of the public sector (faster attribution of expropriated lands, acceleration of court procedures, improving efficiency of the archaeological services).

**50.**

The Commission notes that the roads built may have had different characteristics and initial completion time schedules. Elements such as the difficult geomorphological conditions, complexity of project design and construction, number and position of engineering objects, environmental aspects, etc should also be taken into account when assessing the delivery of projects. These elements may significantly influence the average delay of the audited projects (for example La Herradura project).

# REPLY OF THE COMMISSION

## CONCLUSIONS AND RECOMMENDATIONS

### CONCLUSIONS

#### 51.

The Commission welcomes the result of the audit that shows that roads delivered results in terms of travelling time savings and safety, which are important objectives for road infrastructures.

The impact assessment for projects has to be combined with evaluations to explore the mechanisms of change, as well as other factors which play a role in the economic environment (such as economic cycles, disposable income, transport trends, development of other transport modes, etc). In addition, the impact on economic development may depend on completion of a network of roads and other transport modes, rather than one project.

#### 52.

The economic downturn may have had an impact on traffic.

In addition, road infrastructure projects have an expected lifetime of approximately 30 years. Their return on investment should be based on traffic data for the whole lifetime and not only on the first few years of usage (up to 2010).

#### 53. (a)

Transport is a derived demand and has a strong link with the economic situation. The economic slowdown and crisis might have affected both the level and the composition of traffic flows, which should be carefully assessed such as the percentage of lorries, buses, motorbikes, etc. External factors, such as the fuel price, might have an influence on transport choices and on the AADT of the project. Seasonal peaks might also be evaluated (tourist flows for instance) if appropriate.

In addition, road infrastructure projects have an expected lifetime of approximately 30 years. The traffic flows should ideally be evaluated over this period and for the whole lifetime, and not only on the first few years of usage. Traffic forecasts take this longer perspective into consideration.

#### 53. (b)

Cohesion Policy is implemented under the principle of shared management and subsidiarity. In this context a Member State has the possibility and first responsibility to opt for a certain type of road against another. All options are potentially acceptable under the condition that the co-financed projects have a positive socio-economic impact and their selection is in line with the programming documents adopted in consultation with the Commission.

In addition, a Member State's decision on the 'type' of investment ('express road' or 'motorway') does not only depend on its cost. It also depends on the long term infrastructure planning of this Member State and the macro-economic effects of that investment (and the entire network being developed) on the whole region/country.

#### 53. (c)

Roads built may have had different characteristics and initial completion time schedules. Difficult geomorphological conditions, complexity of project design and construction, number and position of engineering objects, environmental aspects, etc should also be taken into account when assessing the delivery of projects.

#### 54.

The exclusion of abnormally low offers is in line with public procurements rules, as far as the exclusion of an offer is not made automatically and each candidate has been given the possibility to explain the reasons that allowed the offer of a lower price (see point 73, case Lombardini (C-285/99)).

Having phased out the procurement system based on the mathematical formula, in Spain currently the winning bid is not only chosen because of being the lowest financial offer. There are other criteria, such as quality, execution deadline, environmental requirements, functional characteristics of the works, the availability and cost of replacements, etc.

Due to the financial correction applied by the Commission for the use of mathematical formulas in Greece and the subsequent phasing out of this practice, the risk of providing services based on higher unit prices by excluded companies within joint ventures is reduced.

## REPLY OF THE COMMISSION

### 55.

Demand forecasts and therefore the related cost per use take into consideration the very specific context of the regions. In regions lagging behind, where depopulation is a recent trend, the building of new roads is often a measure to improve the accessibility of such remote areas ('*désenclavement*'), since the road's objective is to serve as an incentive with an effect over time. Hence, in such regions, it is normal that for a certain (usually short) period the number of average daily users is low.

Furthermore, the accessibility of infrastructure also has effects in terms of workers mobility and impacts on the unemployment rates in less populated regions, but with better accessibility.

This analysis also depends highly on the geographical circumstances under which the audited roads were built. It is self-evident that technically more complex roads have higher costs per km and user than other roads.

### RECOMMENDATIONS

#### Recommendation 1

The Commission agrees with this recommendation and considers it as partially implemented. It has indeed already undertaken several unit cost studies in recent years and will continue to do so.

In their assessment of major projects in the current programming period the Commission checks unit costs in comparison to other similar projects and raises questions where additional justification is required. JASPERS, in their work with major projects look into unit costs and compare them with unit costs in other projects in the sector as well as other international practice.

The Commission will consider the issue of unit costs in the update of the Commission's guide on cost-benefit analysis for the next programming period for the benefit of all types of projects included under co-financed programmes.

#### Recommendation 2 (a)

The Commission shares the view that road projects should have clear objectives accompanied by appropriate indicators and considers this recommendation as already implemented for major projects. In the current period this information is required as part of major projects' description, as well as in the cost-benefit analysis. The Commission proposal for the Structural and Investment Funds for the next programming period contains a comprehensive performance framework and conditionality which, if adopted, will help in ensuring that future road projects will contain clear objectives accompanied by indicators.

The Commission considers that the effects on the economy will depend not only on road projects but also the contribution of other economic and social factors. In this regard the Commission recalls that this contribution of the road project to the economic effect can be disentangled from other contributions by means of an evaluation not an indicator.

#### Recommendation 2 (b)

The Commission agrees with this recommendation and considers it as partly implemented. In the current period the selection of reasonable and cost-effective technical solutions is considered as part of the feasibility study and option analysis carried out for each major project which should result in selecting the best solution. Member States are expected to apply the same principles on non-major projects, for example through the selection criteria. In addition, the Guide to Cost-Benefit Analysis of investment projects, issued in 2008 by the Commission (Directorate-General for Regional and Urban Policy), applies to all types of projects and not only to major projects. The Commission will consider methods of sharing best practices in the field, for example through the use of JASPERS know-how.

## REPLY OF THE COMMISSION

### **Recommendation 2 (c)**

The Commission considers this recommendation as implemented. The EU directives on public procurement aim at ensuring the principles of fair and open competition throughout the EU, equal treatment of all economic operators without giving undue advantages or creating barriers, obtaining the best value for public money, etc. Co-financing from Cohesion Policy is subject to conformity with these principles of EU directives on public procurement and EU policies. The Commission monitors that these are implemented in practice and takes corrective actions when necessary. For the next programming period, *ex ante* conditionality linked to public procurement is foreseen.

### **Recommendation 3**

The Commission agrees with this recommendation and considers it as partly implemented. In the current programming period traffic forecasts are required as part of the demand analysis presented in the application form and cost-benefit analysis for each major project in road sector, which are then carefully assessed by the Commission to ensure they are realistic. The Commission's Guide to Cost-Benefit Analysis of investment projects, which applies to all projects, also gives guidance on carrying out traffic forecasts. The Commission will also invite JASPERS to consider this topic for planning their future networking platform meetings with Member States to promote the exchange of best practices.

### **Recommendation 4**

The Commission acknowledges the need for making available more detailed unit costs information and will consider the issue in the update of the Commission's Guide to Cost Benefit Analysis for the next programming period.





European Court of Auditors

**Special Report No 5/2013**

**Are EU Cohesion Policy funds well spent on roads?**

Luxembourg: Publications Office of the European Union

2013 — 45 pp. — 21 × 29.7 cm

ISBN 978-92-9241-270-8

doi:10.2865/71435



## HOW TO OBTAIN EU PUBLICATIONS

### Free publications:

- one copy:  
via EU Bookshop (<http://bookshop.europa.eu>);
- more than one copy or posters/maps:  
from the European Union's representations ([http://ec.europa.eu/represent\\_en.htm](http://ec.europa.eu/represent_en.htm));  
from the delegations in non-EU countries ([http://eeas.europa.eu/delegations/index\\_en.htm](http://eeas.europa.eu/delegations/index_en.htm));  
by contacting the Europe Direct service ([http://europa.eu/eurodirect/index\\_en.htm](http://europa.eu/eurodirect/index_en.htm)) or  
calling 00 800 6 7 8 9 10 11 (freephone number from anywhere in the EU) (\*).

(\*) The information given is free, as are most calls (though some operators, phone boxes or hotels may charge you).

### Priced publications:

- via EU Bookshop (<http://bookshop.europa.eu>).

### Priced subscriptions:

- via one of the sales agents of the Publications Office of the European Union  
([http://publications.europa.eu/others/agents/index\\_en.htm](http://publications.europa.eu/others/agents/index_en.htm)).

THE COURT AUDITED A SAMPLE OF EU CO-FINANCED ROAD PROJECTS IN GERMANY, GREECE, POLAND AND SPAIN. THE AUDIT FOUND THAT, ALTHOUGH THE PROJECTS INCREASED SECURITY OF TRAVELLERS AND REDUCED TRAVELLING TIME, SOME ROADS WERE BUILT LARGER AND OVER COMPLEX THAN WERE THE ACTUAL TRAFFIC REQUIREMENTS. SIGNIFICANT COST DIFFERENCES EXIST BETWEEN COUNTRIES AUDITED. THE COURT RECOMMENDS ANALYSING THE CAUSES OF THE COST DIFFERENCES AND MORE REALISTIC PLANNING FOR FUTURE ROAD PROJECTS.



EUROPEAN COURT OF AUDITORS



ISBN 978-92-9241-270-8



9 789292 412708