

1 Has the latest global financial crisis changed the way road public-
2 private partnerships are funded? A comparison of Europe and
3 Latin America

4 **Abstract**

5 A financial/economic crisis may have an adverse effect on transport public-private partnerships (PPPs) as both
6 traffic demand is negatively influenced, and governments are further under pressure. However, research on
7 awarded road PPP contracts over a 20-year period in the European Union (EU) and Latin America and the
8 Caribbean (LAC) showed that the market slowdown is brief and followed by a re-bounce leading to an overall
9 upward trend. The LAC region has experienced multiple financial setbacks with no significant change in the PPP
10 market structure as opposed to the EU, where significant changes were observed concerning a shift in the
11 remuneration schemes employed.

12
13 *Keywords:* global financial crisis; public-private partnership; remuneration scheme

14 **1. Introduction**

15 Long term economic growth is among other things dependent on infrastructure, especially transport
16 infrastructure investments (EC, 2009). To this end, public-private partnerships have been promoted in support of
17 limited or restricted public budgets (EC, 2009; WB et al., 2014). While PPPs seem quite suitable for the
18 provision of transport infrastructure (Engel et. al., 2013), they have shown a number of limitations: high
19 transaction costs (Välilä, 2005, Blanc-Brude et al., 2006), incomplete contracts that require repeated
20 renegotiations (Välilä, 2005), inappropriate risk allocation (Engel et al., 2013), etc. More specifically,
21 Roumboutsos and Pantelias (2014) advocate that revenue risk is related critically to the remuneration scheme
22 and is in essence the demand risk, counterparty risk or a combination of the two.

23
24 Although the impact of the latest global financial crisis on PPPs has been a subject of many reports and research
25 (Burger et al., 2009; Hall, 2009; Kappeler and Nemoz, 2010; Kappeler, 2012), only a few focused on the
26 remuneration scheme. Burger et al. (2009) found that 95 out of 316 global PPP projects reported delays

1 predominantly due to the financial crisis. The largest delays were observed in projects in the energy and
2 transport sectors. They also identified that changes in the risk distribution can shift the cost burden between the
3 parties and weaken the attractiveness of PPPs.

4
5 Similarly, in 2010, an economic and financial report was produced for the European Investment Bank (EIB) with
6 a particular focus on the recent financial crisis and European PPP projects (Kappeler and Nemoz, 2010). A drop
7 in PPP projects was noted as well as a change in the re-payment structure. The analysis was done on a relatively
8 large sample of 1340 European PPP projects for the period 1990–2009.

9
10 This paper attempts to shed more light on the impact of the latest financial crisis on PPPs funding in two
11 regions, the EU and LAC. Interestingly, the two regions share key characteristics: PPPs are widely used for the
12 delivery of transport infrastructure and financial crises have hit both regions at different times and with different
13 magnitudes. Their comparison over time allows for the identification of trends in the global PPP market and its
14 behaviour when experiencing a financial crisis. This is extremely relevant today given the number of recent
15 studies predicting a slowdown of global economic growth and, possible occurrence of a new financial crisis
16 (IMF, 2019). To this end, this paper presents the development of road PPP awarded projects over time focusing
17 on the effects of the financial crises. This is a sector highly vulnerable to an economic slowdown, while
18 representing the largest share of PPP transactions in the transport sector worldwide (WB, 2019).

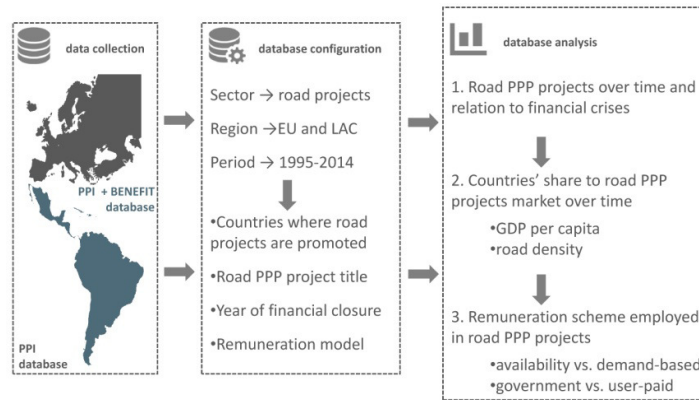
19 **2. Methodology and data**

20 *2.1. Methodology*

21 The proposed methodology for the examination of the latest global financial crisis impact on road PPP projects is
22 comprised of three main steps: data collection, research data configuration and data analysis (Figure 1). The data
23 were collected from several databases. The World Bank's Public-Private Infrastructure Database (WB, 2016a)
24 was the source for data for the LAC region. For the EU, a proprietary list of PPP projects was used. To this list,
25 50 project records were added from the BENEFIT Horizon 2020 research project's case study database
26 (BENEFIT, 2015).

27

1 Only road PPP projects in the EU and LAC that reached financial close between 1995 and 2014 were considered.
 2 This period was split into three sections: the period 1995–2000 which corresponds to the “piloting” of the PPP
 3 model; than 2001–2007 as a “maturing” period of the PPP model and finally the period 2008–2014, following
 4 the global financial crisis.

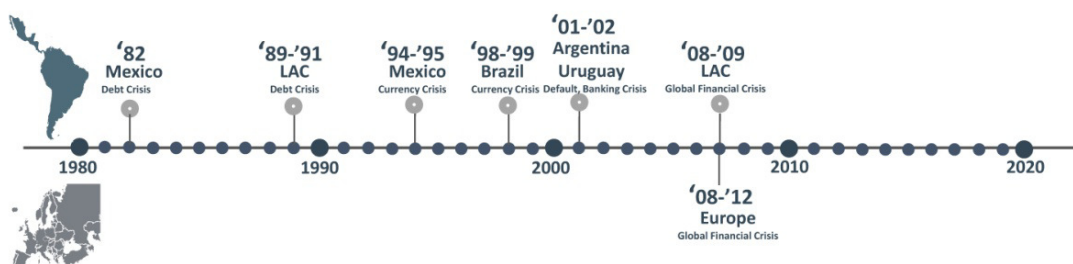


5 Fig. 1 Overview of the research methodology

6 Both research databases had to be reconfigured to include the following information: the country where the road
 7 PPP project was promoted, the project title, the year of financial close and the employed remuneration scheme.
 8 The data were then submitted to a descriptive and comparative analysis with respect to three parameters: number
 9 of projects awarded, countries activity in the road PPP market and the remuneration scheme contracted at the
 10 time of financial close.

11 *2.1.1. Road PPP projects over time and relation to financial crises*

12 The number of road PPP projects was included in order to determine whether there was a drop in the number of
 13 new road PPP projects following financial crises. In this context, the timeline of each crisis for both regions was
 14 established. The number of road PPP projects over time was then recorded with a special focus on the dates of
 15 the financial crises (Figure 2). The first two crises in the LAC region emerged in Mexico in 1982 and 1994–
 16 1995. They were followed by the Brazilian crisis in 1998–1999, Argentina's and Uruguay's crisis in 2001–2002.
 17 The latest was the global financial crisis which occurred in 2007–2008. The EU had no major financial crisis in
 18 its most recent history and was severely hit by the US-originated crisis of 2007–2008 that was followed by the
 19 European sovereign debt crisis.



1

2 *2.1.2. Countries' share in the road PPP market over time*

3 In this step, the number of road PPP projects and the countries where the road PPP projects were promoted is
4 analysed. To complement this quantitative analysis, two additional variables were considered: GDP per capita
5 and the density of the road networks in respective countries (WB, 2016b). The GDP per capita and road network
6 density were used as proxies of demand for mobility and potential need for investment in road infrastructure,
7 respectively.

8 *2.1.3. Remuneration scheme employed in road PPP projects*

9 When considering remuneration, three basic schemes are considered in the database analysis: (1) user fees
10 (tolls); (2) shadow fees (tolls); and (3) availability fees (WB, 2014). For both user and shadow fees, the private
11 party assumes the traffic demand risk. For availability fees, the demand risk is with the government. For both
12 shadow fee and availability fee schemes the private partner is paid by the government. Depending on the basis
13 for payment, remuneration schemes may be characterized as demand-based (user and shadow fees) or
14 availability-based (availability fee). Again, depending on the origin of payment, remuneration schemes may be
15 characterized as user paid (user fees) or government paid (shadow and availability fees).

16 *2.2. Data*

17 The analysis included 193 EU and 153 LAC road PPP projects that met PPP definition criteria and reached
18 financial close between 1995 and 2014.

19 **3. Findings and discussion**

20 *3.1. Road PPP projects over time*

21 Figure 3 depicts the distribution of the new road PPP projects initiated in the EU and LAC between 1995 and
22 2014, while the times of crises are also depicted. When it comes to the number of road PPP projects, the latest
23 global crisis had a minor impact in the LAC region: after a slight setback, the number of new PPP contracts
24 continued to grow. In the EU, there was a moderately steady development of the road PPP market until the
25 global EU sovereign debt crises. Since 2008 the number of projects decreased constantly until 2013 when a
26 rebound of the EU road PPP market started.

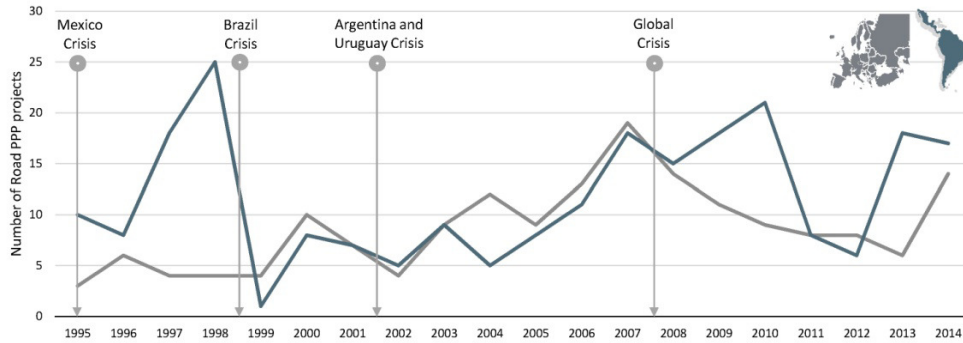


Fig.3 Number of new road PPP projects initiated over time in the EU and LAC region vs. financial crises points

3.2. Countries' share in the road PPP market over time

In the EU the UK, as promoter of PPP road projects, was followed by Spain that had leading role on the market since 2000, followed by Portugal, Ireland and Greece, that had significant share in the road PPP market before the crisis, but almost disappeared after it. After the crisis a number of new countries joined, like Denmark, Austria and Slovakia. Interestingly, the number of projects reaching financial close in the second and third period was approximately the same, 73 and 70 projects, respectively.

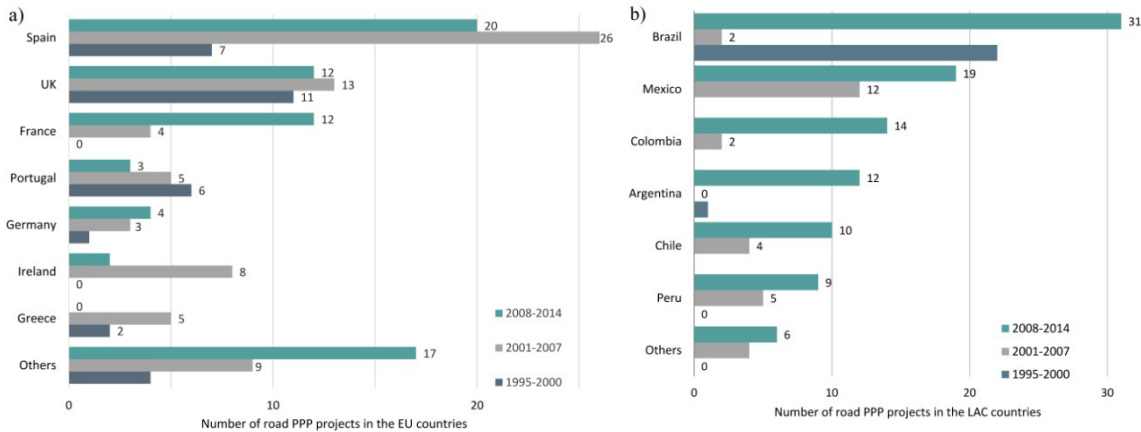


Fig.4 Number of road PPP projects awarded in the EU (a) and the LAC (b) countries from 1995 to 2014

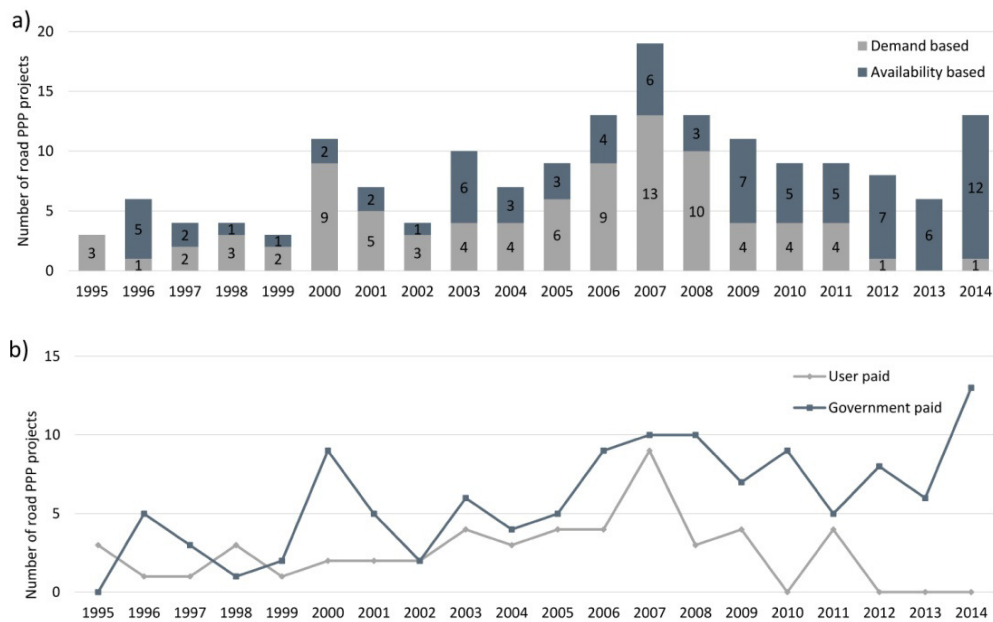
Looking at the overall period in LAC (Figure 4b), only 6 out of the 21 countries stood out with a significant share in the road PPP market. Despite fluctuations, Brazil and Mexico could be considered as leaders over the entire period, with Colombia, Chile, Peru and Argentina following. Although the number of road PPP projects that reached financial close was approximately the same in the first and the second period, 23 and 29, respectively, the number of road PPP projects reached a historic peak of 101 projects in the third period.

Comparing these two figures (4a and 4b) in two different periods, before and after crisis, we may see that the number of new road PPPs is on the rise. While the number of new projects for the EU remained almost

1 unchanged, the number of projects in the LAC region tripled contributing significantly to the global PPP market
 2 after crisis.

3 *3.3. Remuneration schemes employed in road PPP projects*

4 The strong shift to an availability-based remuneration scheme is very evident in the EU with a definite switch
 5 from road PPP projects being typically remunerated through demand-based schemes to availability-based ones
 6 (Figure 5a). Notably, demand-based remuneration schemes were more in line with the overall approach
 7 governments had for PPPs i.e. the relief of the public budget. The involvement of government in the road PPPs
 8 concluded after 2008 is more pronounced in (Figure 5b), as most of the projects in recent years have been
 9 remunerated through purely government-paid schemes.



10 Fig. 5 (a) Availability vs. demand based remuneration schemes of road PPP projects in the EU; (b) User vs. government paid remuneration
 11 schemes of road PPP projects in the EU (source: Mladenovic et al, 2016)

12
 13 Figure 6 presents the remuneration scheme distribution depending on the origin of payment in the LAC region.
 14 Following the crisis in Argentina and Uruguay, since 2004, significant involvement of government may be
 15 noted. Government-paid-based schemes dominated over user-paid schemes in 2006, 2007 and 2010. However,
 16 these might only be considered a reaction rather than a shift in policy, as they only manifest at particular points
 17 in time since user-paid schemes remain dominant. Moreover, as of 2010, user-paid remuneration schemes are
 18 clearly favoured over government-paid ones.

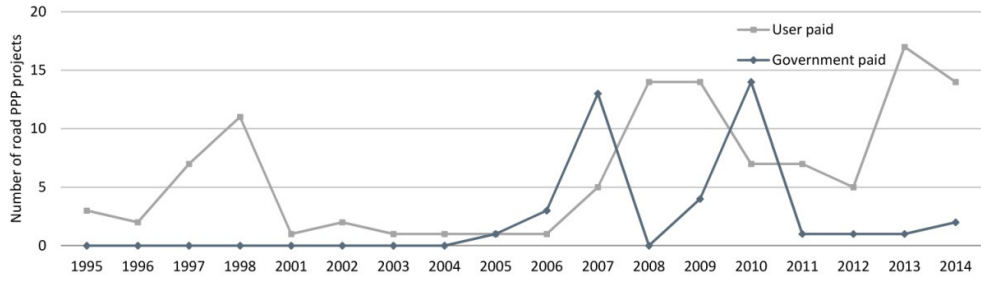


Fig.6 User vs. government paid remuneration schemes of road PPP projects in the LAC

1

3.4. Discussion

2

3 The previous section showed a clear picture of a setback following a financial crisis in the PPP road market. In
 4 the EU, this was expressed through a reduction in the number of new road PPP projects immediately after the
 5 crisis followed by a slow rebound. However, the most pronounced and permanent effect has been the change in
 6 the preferred remuneration scheme as well as in the countries implementing road PPP projects. This trend was
 7 not witnessed in the LAC region. Here again, the crisis did produce a slowdown and, while there was some
 8 reluctance in using the demand-based remuneration schemes, these schemes continue to be the prominent choice.
 9 In order to shed further light upon the developments and more so upon the potential ramifications these may
 10 have, the key variables of the countries contributing to the road PPP markets in the EU and LAC are considered,
 11 i.e. GDP growth and road network density. The need for investments in road infrastructure is expected to be
 12 greater the increase in GDP and the lesser the road network density.

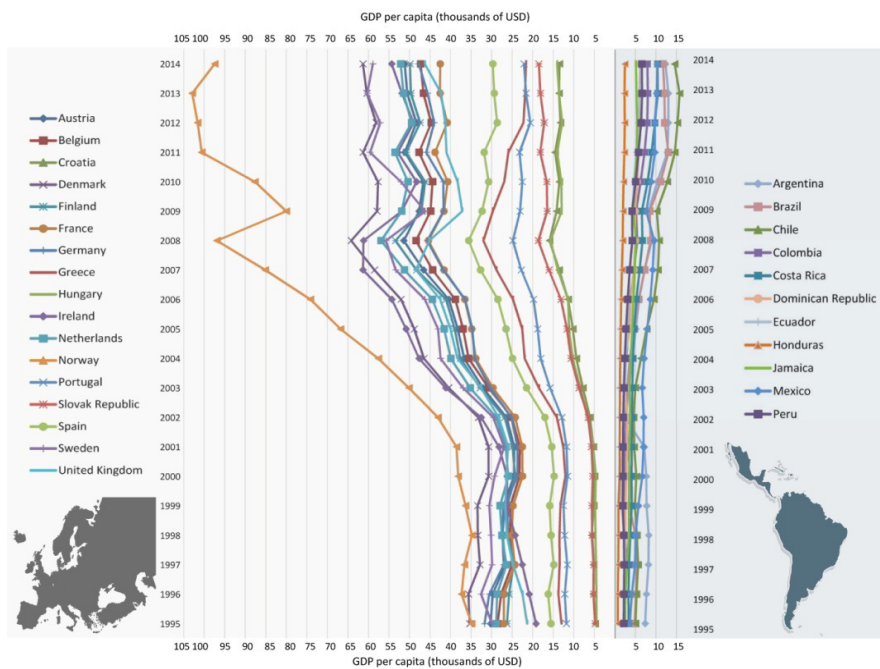


Fig. 7 GDP per capita in thousands of USD in the EU and in the LAC

13

1 Figure 7 shows significantly higher GDP per capita in the EU than in the LAC. The highest historical value of
2 GDP per capita in EU was approximately eight times higher than GDP per capita value in the LAC, USD 103
3 thousand (Norway) in contrast to USD 13 thousands (Chile). However, it may be noted that the latest financial
4 crisis had a stronger effect on the EU region. The drop in GDP per capita was higher for the EU than the LAC,
5 17% (Norway) compared with 5% (Chile) respectively. Also the time period to the rebound was longer in the EU
6 than in the LAC.

7

8 When it comes to road density, with the exception of Belgium (500 km of roads per 100 km² of land area) and
9 Netherlands (100 km of roads per 100 km² of land area), the majority of countries in the EU have between 100
10 and 200 km of roads per 100 km² of land area. Only Croatia, Greece, Norway and Portugal have below 100 km
11 of roads per 100 km² of land area. In the LAC region Jamaica has the densest road network (200 km of roads per
12 100 km² of land area) with Costa Rica far behind with 70 km of roads per 100 km² of land area. Others have
13 between 6 and 25 km of roads per 100 km² of land area.

14

15 According to GDP per capita, the countries marked as leaders of both PPP markets are the countries with strong
16 macroeconomic conditions in their respective region. The drop in GDP per capita growth and high levels of road
17 network density (cca. 150 km of roads per 100 km² of land area on average) may explain the decrease in demand
18 for road PPP projects in the EU and the importance given by policy makers to maintenance and exploitation of
19 existing capacities.

20

21 On the contrary, the higher growth rate of GDP per capita in the LAC after the crisis along with the low road
22 density may justify the increase in the number of road PPP projects, which continue to be used as a tool to
23 promote economic growth and infrastructure development. In addition, GDP growth suggests increase in traffic
24 demand and, therefore, creates a stable environment for the private partners which are more willing to assume
25 the demand risk.

26 **4. Conclusions**

27 The impact of the latest global financial crisis on the road PPP projects was reviewed over a 20-year period in
28 the EU and LAC regions. The PPP road market demonstrated a slowdown following each crisis. In the LAC
29 region, the re-bounce was immediate. In the EU, it took longer for the road PPP market to re-bounce.

1 Interestingly the number of projects in the seven year period before and after the crisis remained approximately
2 the same in the EU, while tripled in the LAC region. Additionally, the countries with strong macroeconomic
3 conditions and medium road density, such as Spain and UK, kept their leading position in the EU PPP market
4 with several new countries that joined. Similarly, on the LAC PPP market, Brazil, Mexico, Colombia and
5 Argentina led the re-bounce after the financial crisis, while other countries remained to be active.

6
7 In the LAC region, this shift to government supported remuneration schemes was short and may only be
8 considered as a reaction to the risk aversion of road PPP markets. However, the issue remains with respect to the
9 appropriateness of the demand/revenue risk allocation agreement. The characteristics of the road network, may
10 allow governments in LAC to continue to use demand-based remuneration schemes for road PPPs. The same
11 does not seem to apply for the EU, where PPPs are now favoured or pursued by countries with strong institutions
12 and positive macroeconomic outlook. This is in direct contrast with the initial purpose of promoting the PPP
13 model in the EU.

14 **Acknowledgements**

15 The authors wish to thank Dejan Makovšek for suggesting this review.

16 **Funding**

17 The results of this study were obtained from research carried out within the framework of the BENEFIT
18 (Business Models for enhancing Funding and enabling Financing for Infrastructure in Transport) project. The
19 BENEFIT project has received funding from the EU's Horizon 2020 under grant agreement No 635973.

20 **References**

- 21 BENEFIT WIKI Case Studies, Available at: http://www.benefit4transport.eu/wiki/index.php?title=Case_Studies
- 22 Blanc-Brude, F., Goldsmith, H., & Väilä, T. (2006). Ex ante construction costs in the European road sector: A comparison of public-private
23 partnerships and the traditional procurement. Luxembourg: European Investment Bank.
- 24 Burger P., Tyson, J., Karpowicz, I., & Delgado Coelho, M. (2009). The effects of the financial crisis on public-private partnerships.
25 Washington D.C: International Monetary Fund (IMF).
- 26 Engel, E., Fischer, R., & Galetovic, A. (2013). The basic public finance of public-private partnerships. *Journal of the European Economic*
27 *Association*, 11(1), 83-111.
- 28 European Commission (EC) (2009). Mobilizing private and public investment for recovery and long term structural change: Developing
29 public private partnerships. COM (2009) 615 final. Brussels: Commission of European Communities.
- 30 Hall, D. (2009). A crisis for public-private partnerships. London: Public Services International Research Unit (PSIRU).
- 31 International Monetary Fund (IMF) (2019) Global Financial Stability Report. Vulnerabilities in a Maturing Credit Cycle. Washington, DC

1 Kappeler, A., & Nemoz, M. (2010). Public-private partnerships in Europe - before and during the recent financial crisis. Luxembourg:
2 European Investment Bank (EIB).

3 Kappeler, A. (2012). PPPs and their financing in Europe. Recent trends and EIB involvement. Luxembourg: European Investment Bank
4 Mladenović, G., Roumboutsos, A., Campos, J., Cardenas, I., Cirilovic, J., Costa, J., González, M.M., Gouin, T., Hussain, O., Kapros, S.,
5 Karousos, I., Kleizen, B., Konstantinopoulos, E., Lukasiewicz, A., Macário, R., Manrique, C., Mikic, M., Moraiti, P., Moschouli, E.,
6 Nikolic, A., Nouaille, P.F., Pedro, M., Sintes, F.I., Soeipto, M., Trujillo Castellano, L., Vajdic, N., Vanelslander, T., Verhoest, C.,
7 Voordijk, H. (2016). Deliverable D4.4- Effects of the Crisis & Recommendations, BENEFIT (Business Models for enhancing Funding and
8 enabling Financing for Infrastructure in Transport) Horizon 2020 project, grant agreement No 635973. Available at
9 <http://www.benefit4transport.eu/index.php/reports>.

10 Roumboutsos, A., & Pantelias, A. (2014). Allocating revenue risk in transport infrastructure public-private partnership projects: How it
11 matters. *Transport Reviews*, 35(2), 183-203.

12 Väilä, T. (2005). How expensive are cost savings? On the economics of the public-private partnerships. 10, 95-119. Luxembourg: European
13 Investment Bank.

14 World Bank (WB), Asian Development Bank (ADB) & Inter-American Development Bank (IADB) (2014). *Public-private partnerships*.
15 *Reference guide, version 2.0*. Washington: The World Bank Group.

16 World Bank (WB) (2016a). Private Participation in Infrastructure Database. <http://ppi.worldbank.org/customquery> Accessed 31.03.2016.

17 World Bank (WB) (2016b). World Development Indicators. <https://datacatalog.worldbank.org/dataset/world-development-indicators>
18 Accessed 31.03.2016.