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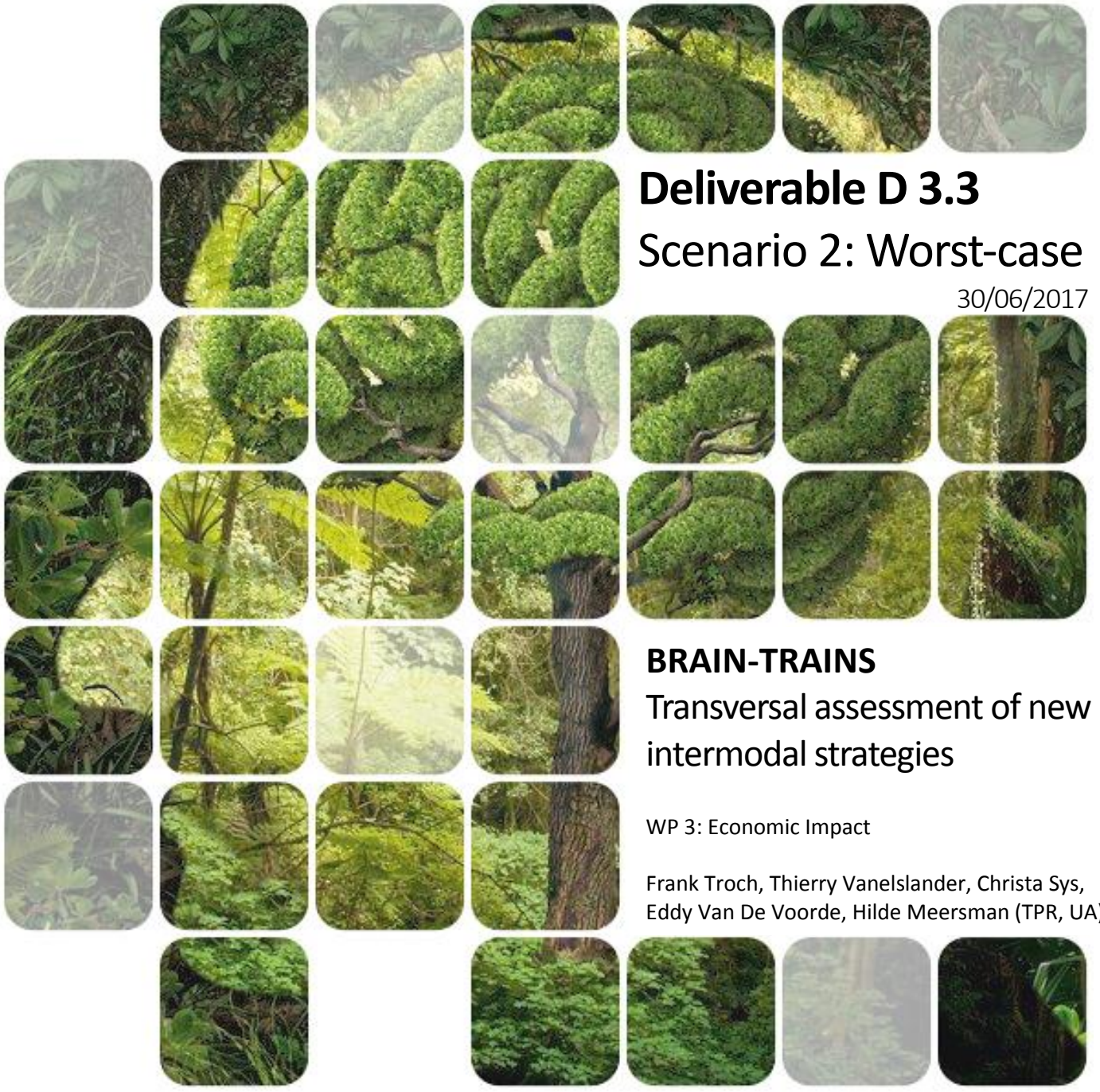

Deliverable D 3.3

Scenario 2: Worst-case

30/06/2017

BRAIN-TRAINS

Transversal assessment of new intermodal strategies

WP 3: Economic Impact

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INTRODUCTION

The BRAIN-TRAINS project deals with the importance of rail freight development and its link with the increasing significance of intermodality in Belgium. The main goal of the project is to develop a blue print establishing the detailed criteria and conditions for developing an innovative intermodal network in and through Belgium, as part of the Trans-European Transport Network and related to different market, society and policy-making challenges. The project develops an operational framework in which effective intermodal transport can be successfully established in Belgium, with attention to beneficial participation and commitment of all different stakeholders.

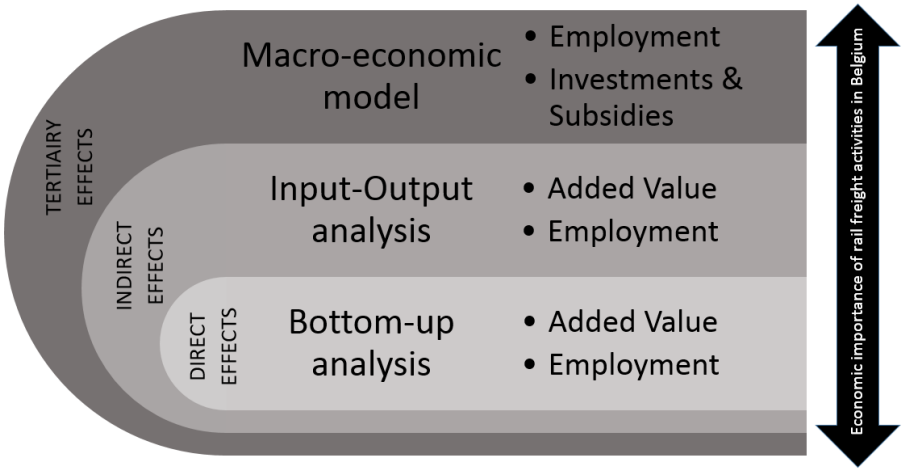
The present deliverable, *'Scenario 2 - Worst-case',* is the second deliverable in a series of three within *Work Package 3 (WP 3): Economic impact of rail freight transport in Belgium.* This economic impact of rail freight transport in Belgium, with rail transport also being part of the intermodal chain, can be assessed based on added value, employment and investments. The objective of this WP is to quantify these three economic indicators under different scenarios. Within previous research[1], it is found that both economic growth and transport growth share a strong mutual connection. Hence, this finding confirms the importance of understanding and measuring the relationship between rail freight transport and the national economy. As such, this insight will help decision makers and policy makers understand complex managerial problems in the field of rail transport development, by translating them into a quantified approach. The output of this analysis can support the stakeholders in their decision process for future rail freight development.

Within Deliverable 1.1 – 1.3, a SWOT analysis was performed and multiple possible scenarios for rail freight transport development have been explored[1] (Troch et. al., 2015; Vanelslander et. al., 2015). A methodological approach was set out in deliverable 3.1[1] (Troch, Vanelslander & Sys, 2016). From this methodological deliverable, the instruments that allow measuring the impact of rail freight transport on the Belgian economy are applied, with rail transport also being a part of the intermodal chain. Figure 1 gives an overview of how this economic impact of rail freight transport in Belgium is analysed within the BRAIN-TRAINS project. Within Deliverable 3.2, the input-output methodology was used to calculate the indirect economic impact of an increase in final consumption of rail freight transportation, applied to the best-case scenario[1]. This is the middle shell shown in figure 1, estimating the indirect economic effects of rail freight transport development. These are indirect effects, as the influence of intermediary supplies is taken into account, causing a chain effect throughout the economy. The current deliverable 3.3 focuses on the economic parameters 'employment' and 'added value' of rail freight operators, analysed from the company level and focusing on the direct economic impact, as shown as the inner shell or layer in figure 1. Indirect consequences due to spill-over effects from intermediary purchases are not addressed within this deliverable.

These indicators are therefore studied at the micro-economic or company level, with Lineas Group (formerly known as B Logistics and NMBS Logistics) as a specific case, and will be applied to the worst-case scenario of Deliverable 1.3 (Troch et al., 2015). The question that will be answered in this scenario analysis is how a scenario where the modal shift is not achieved and rail is losing its beneficial social position will impact the Belgian rail freight development and the Belgian Economy, through the use of the indicators 'added value' and 'employment'. Investments are left out of scope within this deliverable and will be handled in deliverable 3.4, taking into account the tertiary effects shown in figure 1.

[1] The results of previous deliverables can be consulted on http://www.brain-trains.com

FIGURE 1: FRAMEWORK FOR ECONOMIC ANALYSIS OF RAIL FREIGHT TRANSPORT DEVELOPMENT IN BELGIUM



SOURCE: TROCH ET.AL. (2016)

As stated in the scenario development in Deliverable 1.3, the goal of the scenario-based approach within this research project is to explore different plausible situations in which the development of rail transport in Belgium and its place within the intermodal transport chain can shift. As such, the obtained results from the application of scenarios are not meant to offer visionary insights into the future, neither are they attempting to forecast the exact events that the future of rail transport development might hold. The main purpose of the developed scenarios is to explore what the impact could be under a certain set of events, and to determine the relationship between certain macro-economic indicators and rail transport development in Belgium.

The ultimate goal of the project research is to build a model in which the macro-economic indicators are used as output parameters for governmental decision makers and rail freight users, when feeding the model with the required input based on a possible development or decision to be taken. In this way, the government and rail freight operators can use the model to measure the impact of certain decisions and developments on the national Belgian economy.

The main components of this deliverable are:

1) A theoretical approach on the calculation of added value
2) The case of the incumbent Belgian rail freight operators 'Lineas Group'
3) The case of other rail freight operators in Belgium
4) Discussion and conclusions with a worst-case scenario application

Throughout the deliverable, the selection of economic indicators and a methodological overview on how to approach the calculation of added value at company level will be discussed in section 1. The required data for the selected calculation methods will be presented in section 2, together with the limitations of these data. Section 3 presents the results when the calculations are executed with the collected data, for the case of the incumbent Belgian rail freight operator 'Lineas Group'. In addition, this section will also highlight other competitors in Belgium and how the economic parameters and indicators behave within these companies. Finally this section also incorporates the aforementioned worst-case scenario. The deliverable finishes with a short conclusion and some recommendations for further research in the last section.

1. INDICATOR MODELLING APPROACH

To analyse the economic impact of rail freight transport development on a national economy, the parameters 'added value' and 'employment' will be used to develop three different indicators : (i) production per employment unit, (ii) added value per production unit and (iii) added value per unit of revenue. In order to consider these indicators, a clear understanding of the concept 'added value' is needed, which will be provided in this section. In addition, a more in-depth overview of the different approaches that can be used to calculate added value will be discussed, as well as how they should be interpreted in the continuation of this deliverable. Section 1.1 will focus on the importance and meaning of the parameters 'employment' and 'added value', as well as the final indicators that will be created. Section 1.2 will focus on the methodology procedures that are selected to calculate added value within this deliverable.

1.1. Economic indicators

In the introduction, three parameters are addressed to assess the economic impact of rail freight transport on the economy: (i) added value, (ii) employment and (iii) investments. Looking at different transport sectors, such as road transport, air transport, maritime transport and port activities, and their corresponding studies, it can be seen that these parameters also return to evaluate such economic impact. Vennix (2017) uses added value, employment and investments to estimate the economic importance of air transport and airport activities in Belgium over the period 2013 – 2015. For road freight transport, Kuipers et. al. (2004) focuses solely on the added value of the sector to analyse its economic importance. Looking at maritime and port-related studies, Peeters et. al. (2002) and Coppens et. al. (2007) are addressing the importance of an economic consideration when making development decisions for port expansion or port improvement. This consideration needs to be supported by the use of economic parameters such as 'added value' and 'employment', in order to analyse the impact on the economy as a whole. SERV (2009) uses the parameters 'added value' and 'employment' to assess the impact of the financial and economic crisis on the Belgian economy. Finally, also Meersman et. al. (2012) focus on employment and added value within their Indicator Book to assess the importance of the different freight sectors within the Flemish economy. It should be noted that these parameters are presented for air transport, IWW and land transport including storage activities. No separate category for rail freight transportation is listed. From these studies, it is clear that these parameters can be validated as significant measures to address the economic impact of a freight transport sector on the economy. Within the current deliverable, focus will be put on the parameters 'added value' and 'employment' and their direct impact on the economy. Therefore, only the direct added value will be taken into account. In the continuation of this deliverable, when added value is addressed, this will reflect only the direct added value. Deliverable 3.1 investigated the effect of indirect added value. Deliverable 3.2 will include investments and the possibility of tertiary effects. Linked economic parameters such as energy consumption and emissions are handled within work package 4.

In order to better understand the concepts of 'added value' and 'employment', both parameters will be defined more clearly. Two different approaches can be applied. Firstly, added value is defined by Van de Voorde and Sys (2017) as the sum of labour costs, depreciations, other costs and operating results and exploitation subsidies. This approach is using the production factors such as labour and capital, to obtain the added value. In the next section, this methodology will be referred to as the bottom-up approach. In this approach, added value is observed as the compensation for participating to the company's production

process. Examples are employment costs, taxes, costs for debts and retributions for equity (Vanstraelen, 2005). In a second approach, Peeters et. al. (2002) defines added value, as one of the most relevant indicators for assessing the economic importance of a sector, from a different perspective. Added value is obtained by calculating the difference between the value of the produced services and goods, being the production value, and the value of the necessary purchases to obtain this production. The production value is defined as the revenue, increased by the changes in produced stocks and produced fixed assets (Vanstraelen, 2005). In the next section, this definition will be referred to as the top-down approach. In simple terms, added value shows at a company level which value was added to the purchased services and goods by adding labour and capital. As such, employment is also a part of added value, and is a good indicator for the preservation of knowledge and experience within a company.

As introduced, these parameters will be used to calculate three different indicators, that allow quantifying and measuring the impact on the economy. Vanstraelen (2005) specifies two important indicators that can be observed by using the parameters 'added value' and 'employment'. A first indicator is the added value per full-time equivalent employee (FTE). This indicator is used to assess the productivity and the competitive position of a company (Vanstraelen, 2015).

$$Added\ value\ per\ FTE = \frac{Added\ value}{Average\ workforce} \quad (1)$$

A second indicator can be obtained when combining the added value with the production values of a company. For the rail freight sector, these production values can be expressed in tonkilometers (tkm) or trainkilometers (trainkm). For the current deliverable, tkm will be selected as the main production value for rail freight services as these data are more commonly available.

$$Added\ value\ per\ production\ unit = \frac{Added\ value}{Total\ production\ (tkm)} \quad (2)$$

A final indicator observes the added value range of a company. It can be interpreted as the amount of added value that is contributed by each EUR of production or revenue. This indicator reflects the level of vertical integration of a company, with a higher value resulting in an increased level of vertical integration (Vanstraelen, 2015).

$$Added\ value\ range = \frac{Added\ value}{Production\ value\ (revenue)} \quad (3)$$

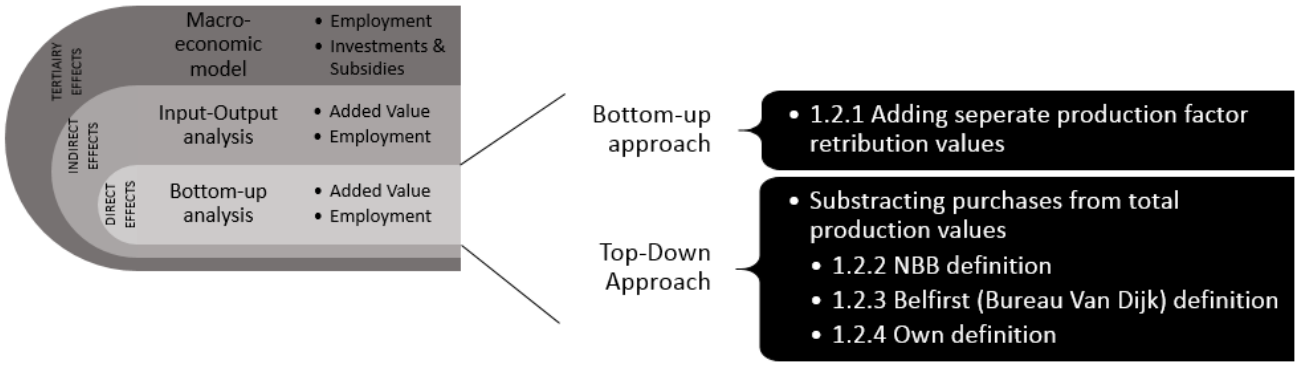
In order to be able to calculate these indicators, the added value needs to be calculated. In the next section, four possible approaches will be identified for calculating the added value of a company.

1.2. Added Value methodology

In this section, the different approaches to calculate added value will be explained. In the previous section, added value has been defined with either a bottom-up or top-down approach. Figure 2 gives an overview of

the four different calculation methods that will be discussed and used within this deliverable. These different ways of calculation are used to reflect on the different outcomes and increase the validity of the interpretation of the final results.

FIGURE 2: FRAMEWORK CONTINUATION FOR ECONOMIC ANALYSIS OF RAIL FREIGHT TRANSPORT DEVELOPMENT IN BELGIUM

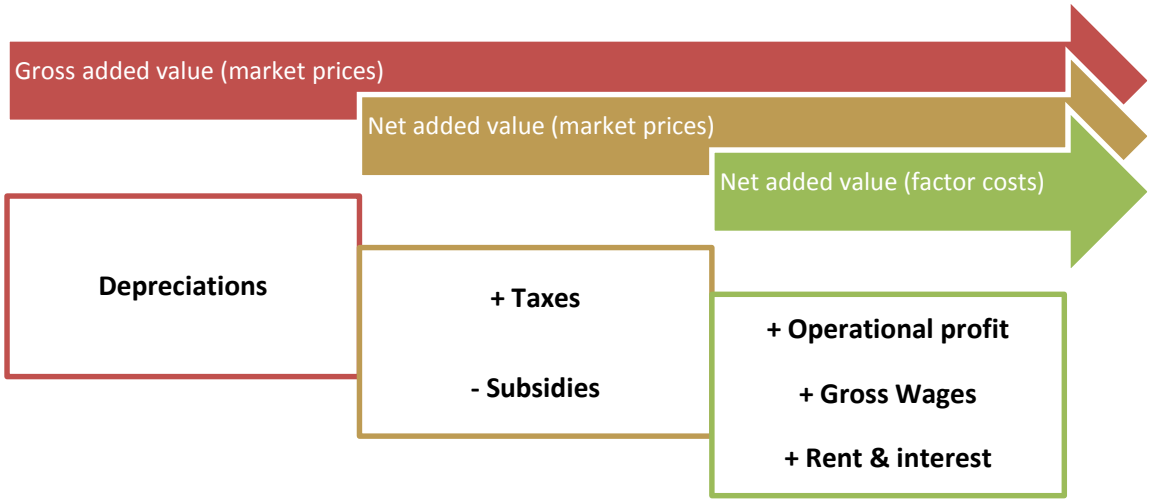


SOURCE: OWN COMPOSITION BASED ON TROCH ET.AL. (2016)

1.2.1. Bottom-up approach

This method to calculate added value uses separate production factor retribution values in order to obtain the total added value. This is shown in figure 3. The core components of net added value against factor costs are: (i) the company's operational profit, (ii) the gross wages and (iii) the rent and interest. These are the production factors that a company requires to add value to its product. As such, the added value is reflecting the difference between revenue and the purchasing value, shows how much value the company added to the service or product when sold (Bloemen, 2017).

FIGURE 3: ADDED VALUE CALCULATION (BOTTOM-UP APPROACH)



SOURCE: OWN COMPOSITION BASED ON WELTEN (1996) AND BLOEMENS (2017)

(i) **Operational profit** is a part of the surplus that has been generated by selling the product at an increased price, relative to the cost of the required inputs. This higher price is justified by adding value to the

product or service (Welten, 1996). Only if enough value is added to the product, the price can be increased to such levels that other production factors such as wage and interest are covered, and a final profit is obtained. Therefore, a positive added value can go hand-in-hand with a negative operational profit, which is an important factor that should be taken into account during the continuation of the analysis.

(ii) The **gross wages** reflect an expenditure for the company, however this amount is generating additional economic impact as it provides financial resources towards the employees.

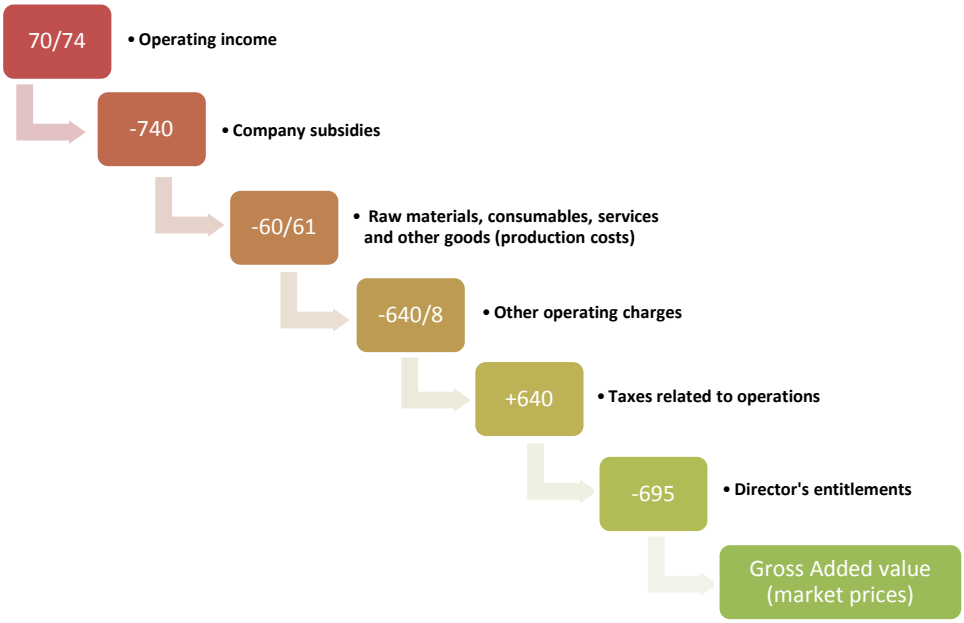
(iii) Also **rent and interest** should be taken into account, as this provides financial resources for the beneficiary.

The net added value as a sum of these three components is equal to the total value of production (revenue decreased by intermediate supplies), minus the depreciation value reflecting the amount necessary to replace capital goods such as buildings and machines (Bloemen, 2017). When depreciation values are included, the gross added value is obtained. In order to differentiate added value measured in market prices instead of factor costs, the taxes and subsidies should also be taken into account. Taxes increase the selling price of the final delivered product of provided service and subsidies decrease the selling price of the final service or product. As such, the net added value in market prices also include the value of the taxes and is lowered by the received amount of subsidies, as shown in figure 3. The gross added value in market prices is obtained by including again the value of depreciations.

1.2.2. Top-Down approach: NBB calculation

The second method to calculate net added value of a company is the top-down approach. Contrary to the first method, the added value is not calculated by adding the different components, but the calculation is started from the total operating income (70/74 in the national accounts) as shown in figure 4.

FIGURE 4: ADDED VALUE CALCULATION (TOP-DOWN APPROACH - NBB)



SOURCE: OWN COMPOSITION BASED ON NBB (2007)

The total operating income is deducted by the intermediary usage of goods and services purchased to realize the production (60/61), as well as other operational costs (640) and director's entitlements (695). The latter can be explained by the reasoning of national accounts that directors are providing services towards their company, and payments related to this service should as such be seen as intermediary consumption and not added value. In order to translate the added value expressed against factor costs towards market prices, the price-lowering subsidies (740) are subtracted and the price-increasing taxes (640) are added. This results in the gross added value in market prices. In order to obtain the net added value in market prices, the depreciation should still be subtracted.

1.2.3. Top-Down approach: Simplified Belfirst (Bureau Van Dijk) calculation

As data is not commonly available, as will be discussed in the next section, Bureau Van Dijk (2017) is proposing an alternative and simplified top-down approach to calculate added value. Belfirst, a database on financial and economic information of Belgian companies, has a direct link with the Central Balance Sheet Office of the National Bank of Belgium and provides a limited amount of parameters based on these data. For the net added value, the cost of materials, services and other goods (60/61) is subtracted from the operating income (70/74). As such, the net added value in Belfirst is not taking into account depreciations and should therefore be treated with care as a gross added value parameter, as an overestimation is included compared to the previous two approaches. Nevertheless, as these data are already available, it will be used and discussed in the next sections in order to compare the different approaches and provide a more in-depth context for the interpretation of the results.

1.2.4. Top-Down approach: Adapted calculation

Finally, the authors of this deliverable have come up with an alternative top-down approach, based on the formula provided by NBB (2007), however with an additional deduction of provisions for risks and costs (635/7). This will prove to be important in the case of rail freight operators, as they are confronted with a high annual fluctuation in this balance sheet category.

2. DATA COLLECTION

In order to execute the above calculations for added value, and the corresponding economic indicators, data collection is necessary. Within this section, the process of data collection will be described and the observed data will be reflected on and discussed, without making calculations yet on the added value and economic indicators itself. The latter will be done in the next section, where a heavy focus will be put on the case of Lineas group, formerly B Cargo, NMBS Logistics and B Logistics, the incumbent rail freight operator in Belgium. Consequently, data collection in this section will be focused on this rail freight operator. A main part of the observed data is also coming from annual accounts, as seen from definitions and approaches in the previous section. Therefore, a strong focus will be put on the period 2010 – 2015, as this is the period where rail freight liberalization in Belgium has been realized and NMBS Logistics became an independent company with the obligation to publish separate annual accounts.

For the pre-liberalization period, where B Cargo was a part of the NMBS holding, historic data of the incumbent operator is partially available through statistical yearbooks. It should be noted that where data is still found in BEF before 2000, standard conversion rules have been applied to convert these amounts into EUR (1 EUR = 40.3399 BEF). The found data will be observed and discussed within this section for the period 1990 - 2009

and the limitations will be highlighted based on a number of interviews with current and previous employees of the national incumbent rail freight operator. Other substantial competitors did not exist before the liberalization and are therefore not taken into account.

2.1. Data overview

Within this section, an overview will be given of the observed data that is needed to calculate the parameters and indicators discussed in section 1. The data will be addressed chronologically according to the official accounts, starting with production values, continuing with income posts and concluding with all relevant cost posts.

2.1.1. Production values in tonkilometer (tkm)

Table 1 gives an overview of the production values in tonkilometers (tkm). Values from the pre-liberalization period (before 2010) are available from the statistical yearbooks provided by NMBS (1990 – 2009). It is clear that rail freight production has experienced an upward trend until the financial and economic crisis struck in 2008 and 2009. As from 2010, NMBS Logistics was liberalized from the NMBS group but due to confidentiality reasons, the actual production values are not allowed to be published as such. Therefore, 2010 is used as a base year, and the following years are expressed as a relative index compared to this year. After a decline until 2014, partially due to the increased competition on the market, lowering the market share of the incumbent rail freight operator, the product is slowly increasing again in the last two years.

For the intermodal production, no values are available for 2010 and 2011. An extrapolation has been used in order to obtain an approximation of this data. Historically, it can be seen that the intermodal product has significantly increased in terms of importance. Whereas at the beginning of the nineties, intermodal rail freight transport was only 12,04% of all business, this share has grown to almost 40% in 2016.

2.1.2. Production values in metric tons (MT)

Table 2 gives an overview of the production values in metric tons (MT). Similar conclusions compared to the production values in tkm can be found. It should also be noted that values as from 2010 have been reflected as a relative indicator compared to the base production value in 2010. For the intermodal production, no values are available for 2010 and 2011. An extrapolation has been used in order to obtain an approximation of this data.

Comparing the data of table 1 and table 2 shows that the gap between demand measured in tkm and MT increases between 2010 and 2016, indicated by the lower index in 2016 shown in table 2 (82.08) compared to table 1 (93). This indicates that cargo is transported over longer distances, as a lower volume in MT is reaching higher levels of tkm. As rail freight transport is known for becoming profitable at larger distances, this could have a positive effect on operational profit and added value levels during this period.

2.1.3. Employment (FTE)

For the values on employment expressed in FTE, a split will be made between the historical data, shown in table 3, and the current data for the incumbent rail freight operator, shown in table 4. Both periods cannot be compared, as NMBS Logistics became an independent company after liberalization in 2010, with a clear FTE allocation for freight services. Before liberalization, human resources within NMBS were allocated to both passenger and freight services.

TABLE 1: PRODUCTION VALUES IN TONKILOMETERS (TKM) (1990 – 2016)

	Total production (tkm)	Intermodal production (tkm)	% Intermodal
1990 *(B Cargo in NMBS group)*	8,354,000,000 tkm	1,006,000,000 tkm	12.04%
1991 *(B Cargo in NMBS group)*	8,187,000,000 tkm	1,018,000,000 tkm	12.43%
1992 *(B Cargo in NMBS group)*	8,346,000,000 tkm	1,061,000,000 tkm	12.71%
1993 *(B Cargo in NMBS group)*	7,581,000,000 tkm	1,407,000,000 tkm	18.56%
1994 *(B Cargo in NMBS group)*	8,081,000,000 tkm	1,642,000,000 tkm	20.32%
1995 *(B Cargo in NMBS group)*	7,287,000,000 tkm	1,532,000,000 tkm	21.02%
1996 *(B Cargo in NMBS group)*	7,244,000,000 tkm	1,606,000,000 tkm	22.17%
1997 *(B Cargo in NMBS group)*	7,465,000,000 tkm	1,858,000,000 tkm	24.89%
1998 *(B Cargo in NMBS group)*	7,600,000,000 tkm	2,040,000,000 tkm	26.84%
1999 *(B Cargo in NMBS group)*	7,392,000,000 tkm	2,190,000,000 tkm	29.63%
2000 *(B Cargo in NMBS group)*	7,674,000,000 tkm	2,325,000,000 tkm	30.30%
2001 *(B Cargo in NMBS group)*	7,080,000,000 tkm	2,113,000,000 tkm	29.84%
2002 *(B Cargo in NMBS group)*	7,298,000,000 tkm	2,240,000,000 tkm	30.69%
2003 *(B Cargo in NMBS group)*	7,293,000,000 tkm	2,334,000,000 tkm	32.00%
2004 *(B Cargo in NMBS group)*	7,691,000,000 tkm	2,463,000,000 tkm	32.02%
2005 *(B Cargo in NMBS group)*	8,130,000,000 tkm	2,556,000,000 tkm	31.44%
2006 *(B Cargo in NMBS group)*	8,442,000,000 tkm	2,527,000,000 tkm	29.93%
2007 *(B Cargo in NMBS group)*	8,148,000,000 tkm	2,571,000,000 tkm	31.55%
2008 *(B Cargo in NMBS group)*	7,882,000,000 tkm	2,625,000,000 tkm	33.30%
2009 *(B Cargo in NMBS group)*	5,438,000,000 tkm	2,063,000,000 tkm	37.94%
2010 *(NMBS Logistics) ** *	100	100*	34.71%
2011 *(NMBS Logistics) ** *	103	99*	33.49%
2012 *(NMBS Logistics) ** *	97	99	35.62%
2013 *(B Logistics) ** *	87	94	37.29%
2014 *(B Logistics) ** *	84	91	37.27%
2015 *(B Logistics) ** *	90	99	38.44%
2016 *(B Logistics) ** *	93	106	39.56%

** No data available, extrapolation value*

*** Confidential data*

SOURCE: OWN COMPOSITION BASED ON NMBS (1990 – 2009), B LOGISTICS (2011 – 2016), INTER FERRY BOATS (2011 – 2016), XPEDYS (2011 – 2016) AND LINEAS GROUP (2017)

TABLE 2: PRODUCTION VALUES IN METRIC TONS (MT) (1990 – 2016)

	Total production (MT)	Intermodal production (MT)	% Intermodal
1990 *(B Cargo in NMBS group)*	67,126,000 MT	6,648,000 MT	9.90%
1991 *(B Cargo in NMBS group)*	64,709,000 MT	6,467,000 MT	9.99%
1992 *(B Cargo in NMBS group)*	63,803,000 MT	5,802,000 MT	9.09%
1993 *(B Cargo in NMBS group)*	57,844,000 MT	7,449,000 MT	12.88%
1994 *(B Cargo in NMBS group)*	63,121,000 MT	9,350,000 MT	14.81%
1995 *(B Cargo in NMBS group)*	59,736,000 MT	9,049,000 MT	15.15%
1996 *(B Cargo in NMBS group)*	57,095,000 MT	9,632,000 MT	16.87%
1997 *(B Cargo in NMBS group)*	58,849,000 MT	11,803,000 MT	20.06%
1998 *(B Cargo in NMBS group)*	60,696,000 MT	12,526,000 MT	20.64%
1999 *(B Cargo in NMBS group)*	59,149,000 MT	13,573,000 MT	22.95%
2000 *(B Cargo in NMBS group)*	61,279,000 MT	14,774,000 MT	24.11%
2001 *(B Cargo in NMBS group)*	57,050,000 MT	13,380,000 MT	23.45%
2002 *(B Cargo in NMBS group)*	57,198,000 MT	14,043,000 MT	24.55%
2003 *(B Cargo in NMBS group)*	55,732,000 MT	14,294,000 MT	25.65%
2004 *(B Cargo in NMBS group)*	58,454,000 MT	16,691,000 MT	28.55%
2005 *(B Cargo in NMBS group)*	60,976,000 MT	18,374,000 MT	30.13%
2006 *(B Cargo in NMBS group)*	59,360,000 MT	17,159,000 MT	28.91%
2007 *(B Cargo in NMBS group)*	57,655,000 MT	18,284,000 MT	31.71%
2008 *(B Cargo in NMBS group)*	55,463,000 MT	18,008,000 MT	32.47%
2009 *(B Cargo in NMBS group)*	36,523,000 MT	15,166,000 MT	41.52%
2010 *(NMBS Logistics) ** *	100	100 *	34.30%
2011 *(NMBS Logistics) ** *	100.43	96.15 *	32.84%
2012 *(NMBS Logistics) ** *	89.72	92.26	35.28%
2013 *(B Logistics) ** *	77.14	78.26	34.80%
2014 *(B Logistics) ** *	74.2	70.37	32.53%
2015 *(B Logistics) ** *	77.67	74.07	32.71%
2016 *(B Logistics) ** *	82.08	81.61	34.11%

** No data available, extrapolation value*

*** Confidential data*

SOURCE: OWN COMPOSITION BASED ON NMBS (1990 – 2009), B LOGISTICS (2011 – 2016), INTER FERRY BOATS (2011 – 2016), XPEDYS (2011 – 2016) AND LINEAS GROUP (2017)

TABLE 3: EMPLOYMENT IN FTE (1990 – 2009)

	Total NMBS workforce	Freight allocated	% Freight
1990	46,151 FTE	Not available	Not available
1991	45,015 FTE	Not available	Not available
1992	44,413 FTE	Not available	Not available
1993	43,845 FTE	97 FTE	0.22%
1994	43,493 FTE	234 FTE	0.54%
1995	42,381 FTE	263 FTE	0.62%
1996	41,730 FTE	284 FTE	0.68%
1997	406,677 FTE	274 FTE	0.07%
1998	40,232 FTE	267 FTE	0.66%
1999	40,469 FTE	470 FTE	1.16%
2000	41,537 FTE	459 FTE	1.11%
2001	42,729 FTE	461 FTE	1.08%
2002	42,908 FTE	453 FTE	1.06%
2003	41,061 FTE	449 FTE	1.09%
2004	19,229 FTE	2,853 FTE	14.84%
2005	18,813 FTE	2,773 FTE	14.74%
2006	18,311 FTE	2,679 FTE	14.63%
2007	18,624 FTE	2,603 FTE	13.98%
2008	20,069 FTE	2,500 FTE	12.46%
2009	20,255 FTE	2,195 FTE	10.84%

SOURCE: OWN COMPOSITION BASED ON NMBS (1990 – 2009)

TABLE 4: EMPLOYMENT IN FTE (2010 – 2015)

		(NM)B(S) Logistics Group		
	Total workforce	*(NM)B(S) Logistics*	*Inter Ferry Boats*	*Xpedys*
2010	**228 FTE**	*0 FTE*	*199 FTE*	*29 FTE*
2011	**344 FTE**	*162 FTE*	*137 FTE*	*45 FTE*
2012	**481 FTE**	*309 FTE*	*110 FTE*	*62 FTE*
2013	**505 FTE**	*373 FTE*	*88 FTE*	*44 FTE*
2014	**659 FTE**	*493 FTE*	*74 FTE*	*92 FTE*
2015	**680 FTE**	*525 FTE*	*64 FTE*	*91 FTE*

SOURCE: OWN COMPOSITION BASED ON B LOGISTICS (2011–2016), INTER FERRY BOATS (2011–2016), XPEDYS (2011–2016)

Table 3 gives an overview of the employment forces before liberalization. Multiple sources within the former B cargo and the current Lineas have confirmed that comparing these figures over time is susceptible to a number of constraints, due to multiple changes in workforce allocation and human resource management strategies. NMBS started in 1993 to allocate a part of the human resource capital directly to B Cargo. Nevertheless, only 0.22% of the total work force was allocated towards freight services, which is a clear underestimation.

In 1998, a reorganisation introduced the use of cost centres and activity centres. These centres existed within the company, recognized as ‘staff services and internal audit’, ‘finances’, ‘human resources’, ‘operations’, ‘freight’, ‘passengers’, ‘materials’, ‘train’, ‘network’, ‘Infrastructure’, ‘patrimonial’, ‘healthcare’ and ‘detached personnel’. As such, an increase in FTE can be noticed, as more FTE outside of B Cargo are partially allocated to the freight activity centre. In reality however, FTE allocated to for example ‘infrastructure’, ‘network’ or ‘operations’ were active in both passenger, freight and other processes, but were allocated fully to their respective activity centres rather than allocating them partially towards the ‘freight’ centre.

In the period 2001-2003, Boston Consulting Group performed a study to set-up a new allocation business model, which should better reflect the actual division of joint costs by spreading for example the FTE over their respective executed services. The study shows that in reality more than 7,522 FTE in operational and supporting functions were to be allocated to freight services, instead of the 450 that are shown in the statistical publications and taken into account in the cost centres. As such, in reality, around 17% of all FTE and the corresponding costs should be allocated to freight services and the freight cost centre. The study resulted in an internal reorganization where FTE partially working for or providing support to freight activities would be partly allocated to the activity centre of freight services for the share these FTE actually performed freight activities. This reorganization lead to a decrease in activity centres, focussing more on the core activities of FTE. The remaining activity centres are 'passengers', 'mobility', 'Europe', 'freight', 'technical' and 'production and general services'.

This reorganization started in 2004, resulting in a drastic increase in FTE allocated to freight. This plan was set in motion by means of a progressive shift, where each year FTE are offered to shift to B Cargo, in order to evolve to a more realistic allocation. However, the liberalization and the split of passenger and freight services, started in 2007 and executed in 2010 for the incumbent operator, has logically concluded this transition operation. As a part of this internal reorganization, part of the FTE who were not working in the core activity centres were no longer calculated in the NMBS workforce, resulting in the decrease of the total NMBS workforce. Although this might give the impression of a large lay-off, this is merely the result of an internal organization where FTE were transferred to another entity, making them disappear from the available statistics for the incumbent operator.

Table 4 gives an overview of the total workforce in FTE for NMBS Logistics Group and B Logistics Group after the liberalization in 2010. As this liberalization process was gradually realised, human resources were also progressively transferred from NMBS towards B Logistics, and a steady increase in total workforce can be noticed. As the transition period is coming to its end, any future increases in FTE are due to growth or business expansion. It can be seen in table 4 that the figures for the total workforce are a combination of three different entities forming NMBS Logistics Group: NMBS Logistics (B Logistics), Inter Ferry Boats and Xpedys. Due to the transition from the NMBS group towards an independent company, the workforce for NMBS Logistics in 2010 is not available. Therefore figures for 2010 should be interpreted with caution in the next section.

2.1.4. Operational income (70/74)

Table 5 gives an overview of the historical operational income of freight services within NMBS. For the operational income allocated to freight, only data as from 2005 is available in the statistical pocket books. Approximately 20% of the total operational income is allocated to freight, while 80% is allocated to passenger services and other activities. Due to the internal reorganization executed in 2004 and the change in allocation and statistics reporting, the total operational income seems to be higher before this year. As such, extrapolations cannot be calculated as no clear joint cost division structures or data references are available for the period 1990 – 2004.

TABLE 5: OPERATIONAL INCOME IN EUR (1990 – 2009)

	Total NMBS Freight operational income (70/74)	Total NMBS operational income (70/74)	% Freight
1990	Not available	€ 2,334,126,708	Not available
1991	Not available	€ 2,471,631,007	Not available
1992	Not available	€ 2,724,815,900	Not available
1993	Not available	€ 3,289,783,352	Not available
1994	Not available	€ 3,194,398,331	Not available
1995	Not available	€ 2,759,874,328	Not available
1996	Not available	€ 3,097,737,963	Not available
1997	Not available	€ 3,171,893,937	Not available
1998	Not available	€ 3,379,731,444	Not available
1999	Not available	€ 3,417,184,560	Not available
2000	Not available	€ 3,636,670,180	Not available
2001	Not available	€ 3,634,752,462	Not available
2002	Not available	€ 3,794,368,800	Not available
2003	Not available	€ 3,719,742,100	Not available
2004	Not available	Not available	Not available
2005	€ 387,800,000	€ 1,940,400,000	19.99%
2006	€ 445,800,000	€ 2,132,900,000	20.90%
2007	€ 460,600,000	€ 2,217,500,000	20.77%
2008	€ 447,100,000	€ 2,281,800,000	19.59%
2009	€ 322,500,000	€ 2,251,500,000	14.32%

SOURCE: OWN COMPOSITION BASED ON NMBS (1990 – 2009)

Table 6 gives an overview of the operational income of NMBS Logistics Group and B Logistics Group after liberalization in 2010. Consequently, this figure only reflects freight services. This data can be found in the published annual accounts in post 70/74. The table also shows the figures for the three separate entities: NMBS Logistics (B Logistics), Inter Ferry Boats and Xpedys. Due to the transition from the NMBS group towards an independent company, the operational income for NMBS Logistics in 2010 is not available. Therefore, figures for 2010 should be interpreted with caution in the next section. Overall, the operational income tends to decrease over the period 2010 – 2015.

TABLE 6: OPERATIONAL INCOME IN EUR (2010 – 2015)

	(NM)B(S) Logistics Group			
	Total operational income (70/74)	***(NM)B(S) Logistics***	***Inter Ferry Boats***	***Xpedys***
2010	**€ 241,200,821**	*€ 0*	*€ 148,663,664*	*€ 92,537,157*
2011	**€ 711,200,478**	*€ 422,511,244*	*€ 179,443,342*	*€ 109,245,892*
2012	**€ 663,262,379**	*€ 410,010,929*	*€ 149,268,634*	*€ 103,982,816*
2013	**€ 628,262,036**	*€ 375,592,818*	*€ 151,719,598*	*€ 100,949,620*
2014	**€ 593,884,201**	*€ 344,698,674*	*€ 138,953,163*	*€ 110,232,364*
2015	**€ 605,613,967**	*€ 347,223,871*	*€ 137,709,759*	*€ 120,680,337*

SOURCE: OWN COMPOSITION BASED ON B LOGISTICS (2011–2016), INTER FERRY BOATS (2011–2016), XPEDYS (2011–2016)

2.1.5. Revenue (70)

Table 7 gives an overview of the historical revenue of freight services within NMBS. The revenue is only a part of the operational income, discussed in the previous section. Over time, freight revenue has lost part of its share in the total revenue of NMBS, indicating that passenger services increased their significance within the

company. This is also visible in table 7, as total revenue in 2009 remains almost at a constant level, whereas freight revenue is dropping significantly. This supports a steady rise in passenger traffic and corresponding generated passenger revenue during this year.

Nevertheless, the observed data should be treated with caution, as the financial allocation over services was only very limited within this period. Due to the internal reorganization executed in 2004, freight revenue suddenly increased its share. This inconsistency in data availability is making it difficult to use revenue as a way to extrapolate the operational income figures for the period 1990 – 2004 in the previous section.

TABLE 7: REVENUE IN EUR (1990 – 2009)

	Total NMBS Freight revenue (70)	Total NMBS revenu	% Freight
1990	€ 391,954,021	€ 1,361,154,655	28.80%
1991	€ 385,074,306	€ 1,402,861,476	27.45%
1992	€ 391,505,358	€ 1,554,495,045	25.19%
1993	€ 348,757,731	€ 1,698,092,904	20.54%
1994	€ 362,339,817	€ 1,488,786,890	24.34%
1995	€ 350,996,036	€ 1,231,272,435	28.51%
1996	€ 329,397,420	€ 1,214,874,380	27.11%
1997	€ 349,110,137	€ 1,862,409,251	18.75%
1998	€ 330,008,552	€ 1,929,270,794	17.11%
1999	€ 318,799,253	€ 2,005,787,776	15.89%
2000	€ 340,076,797	€ 2,186,048,552	15.56%
2001	€ 322,988,700	€ 2,171,282,815	14.88%
2002	€ 332,813,100	€ 2,249,481,900	14.80%
2003	€ 335,431,700	€ 2,329,404,200	14.40%
2004	Not available	Not available	Not available
2005	€ 379,300,000	€ 1,897,200,000	19.99%
2006	€ 432,600,000	€ 2,069,400,000	20.90%
2007	€ 449,100,000	€ 2,157,800,000	20.81%
2008	€ 434,000,000	€ 2,212,500,000	19.62%
2009	€ 307,200,000	€ 2,155,500,000	14.25%

SOURCE: OWN COMPOSITION BASED ON NMBS (1990 – 2009)

Table 8 gives an overview of the revenue of NMBS Logistics Group and B Logistics Group after the liberalization in 2010. Therefore, this figure only reflects freight services. This data can be found in the published annual accounts in post 70. The table also shows the figures for the three separate entities: NMBS Logistics (B Logistics), Inter Ferry Boats and Xpedys. Due to the transition from the NMBS group towards an independent company, the revenue for NMBS Logistics in 2010 is not available. Therefore, figures for 2010 should be interpreted with caution in the next section. It can be seen that the decrease in operational income is mainly due to a decrease in revenue over the period 2010 – 2014. For 2015, the trend is reversed, mainly due to an increase in revenue of Xpedys.

TABLE 8: REVENUE IN EUR (2010 – 2015)

		(NM)B(S) Logistics Group		
	Total revenue (70)	*(NM)B(S) Logistics*	*Inter Ferry Boats*	*Xpedys*
2010	**€ 206,215,979**	*€ 0*	*€ 116,937,108*	*€ 89,278,871*
2011	**€ 659,822,209**	*€ 403,870,574*	*€ 151,989,858*	*€ 103,961,777*
2012	**€ 613,789,374**	*€ 387,578,478*	*€ 125,825,262*	*€ 100,385,634*
2013	**€ 581,096,568**	*€ 351,852,397*	*€ 130,684,733*	*€ 98,559,438*
2014	**€ 556,151,913**	*€ 326,124,899*	*€ 121,556,232*	*€ 108,470,782*
2015	**€ 570,485,950**	*€ 330,372,202*	*€ 121,351,665*	*€ 118,762,083*

SOURCE: OWN COMPOSITION BASED ON B LOGISTICS (2011–2016), INTER FERRY BOATS (2011–2016), XPEDYS (2011–2016)

2.1.6. Subsidies (740)

Data on subsidies is very scarce and not always transparent. Before 2005, rail freight services received direct subsidies from the government as a compensation rule for competition with other modes of land transport, as well as subsidies for army activities. However, after 2005, subsidies have been reformed for supporting

activities providing container transport on short distances. These subsidies were meant to make it possible to be competitive with road transportation, by providing the subsidised service at a competitive market price. As such, these subsidies were meant for freight forwarders directly, and not for rail freight operators. Nevertheless, Inter Ferry Boats is the freight forwarder within the group of NMBS Logistics, and therefore eligible to apply for such subsidies. As from 2010, single wagon load is subsidised in the same way as container traffic. Nevertheless, these subsidy amounts are not always reflected in the annual accounts, as they are often directly settled within the market prices and therefore incorporated in the operational income and revenue. Table 9 is giving an overview of the data found on subsidies provided to the incumbent operator or one of its three entities.

2.1.7. Operational costs (60/64)

Table 10 shows the available data on operational costs of freight activities within NMBS before liberalization. Data on freight allocation of operational costs are only available as from 2005. Approximately 22% of the total operational cost is allocated to freight, which is slightly higher compared to the operational income share shown in table 5. This will result in a negative operating profit and as such a negative pressure on the added value. Due to the internal reorganization executed in 2004, total operational income is higher before this year.

Table 11 gives an overview of the operational costs of NMBS Logistics Group and B Logistics Group after liberalization in 2010. Consequently, this figure only reflects freight services. This data can be found in the published annual accounts in post 60/64. The table also shows the figures for the three separate entities: NMBS Logistics (B Logistics), Inter Ferry Boats and Xpedys. Due to the transition from the NMBS group towards an independent company, the operational income for NMBS Logistics in 2010 is only very limited. Therefore figures for 2010 should be interpreted with caution in the next section. In line with the operational income, the operational cost also tends to decrease over the period 2010 – 2015. Especially from 2011 to 2012, a big drop in operational costs can be noticed. This is due to a shift in provisions for risks and costs, and immediately the reason why the adapted approach in section 1.2.4 will prove important.

TABLE 9: SUBSIDIES IN EUR (1990 – 2015)

	Total subsidies (740)
1990	€ 57,263
1991	€ 27,392
1992	€ 6,619
1993	€ 0
1994	€ 0
1995	€ 0
1996	€ 0
1997	€ 0
1998	€ 24,988
1999	€ 515,619
2000	€ 0
2001	€ 0
2002	€ 0
2003	€ 0
2004	Not available
2005	Not available
2006	Not available
2007	Not available
2008	Not available
2009	Not available
2010	€ 23,191,493
2011	€ 22,135,731
2012	€ 18,410,919
2013	€ 24,608,716
2014	€ 24,906,206
2015	€ 23,196,677

SOURCE: OWN COMPOSITION BASED ON NMBS (1990 – 2009), B LOGISTICS (2011 – 2016), INTER FERRY BOATS (2011 – 2016), XPEDYS (2011 – 2016)

TABLE 10: OPERATIONAL COSTS IN EUR (2005 – 2009)

	Total NMBS freight operational costs (60/64)	Total NMBS operational costs	% Freight
1990	Not available	€ 2,527,564,370	Not available
1991	Not available	€ 2,732,364,226	Not available
1992	Not available	€ 2,942,180,313	Not available
1993	Not available	€ 3,436,907,192	Not available
1994	Not available	€ 3,395,018,745	Not available
1995	Not available	€ 2,922,965,958	Not available
1996	Not available	€ 3,018,966,820	Not available
1997	Not available	€ 3,080,470,409	Not available
1998	Not available	€ 3,198,229,330	Not available
1999	Not available	€ 3,304,489,432	Not available
2000	Not available	€ 3,508,959,324	Not available
2001	Not available	€ 3,596,673,419	Not available
2002	Not available	€ 3,925,735,600	Not available
2003	Not available	€ 3,814,296,000	Not available
2004	Not available	Not available	Not available
2005	€ 451,300,000	€ 2,004,300,000	22.52%
2006	€ 467,200,000	€ 2,129,400,000	21.94%
2007	€ 479,400,000	€ 2,210,200,000	21.69%
2008	€ 530,900,000	€ 2,389,800,000	22.22%
2009	€ 442,200,000	€ 2,539,400,000	17.41%

SOURCE: OWN COMPOSITION BASED ON NMBS (1990 – 2009)

TABLE 11: OPERATIONAL COSTS IN EUR (2005 – 2009)

	(NM)B(S) Logistics Group			
	Total operational costs (60/64)	*(NM)B(S) Logistics*	*Inter Ferry Boats*	*Xpedys*
2010	**€ 240,039,073**	*€ 32,588*	*€ 158,389,304*	*€ 81,617,181*
2011	**€ 828,728,475**	*€ 521,860,483*	*€ 201,845,354*	*€ 105,022,638*
2012	**€ 689,189,067**	*€ 421,939,401*	*€ 157,737,489*	*€ 109,512,177*
2013	**€ 652,135,274**	*€ 399,442,624*	*€ 156,050,763*	*€ 96,641,887*
2014	**€ 615,824,020**	*€ 365,118,181*	*€ 142,184,313*	*€ 108,521,526*
2015	**€ 620,866,564**	*€ 368,347,675*	*€ 138,126,980*	*€ 114,391,909*

SOURCE: OWN COMPOSITION BASED ON B LOGISTICS (2011–2016), INTER FERRY BOATS (2011–2016), XPEDYS (2011–2016)

2.1.8. Raw materials, consumables, services and other goods (60/61)

This is a very important costs post, as it reflects the goods and services that are bought for the realized production. As such, they are the direct inputs on which added value will be created, according to the definitions explained in the previous section.

Table 12 shows the available data on this post before liberalization. It can be seen that unfortunately, no data on raw materials, consumables, services and other goods is available for freight services before 2010. This fits the previous remark on joint cost allocation within the NMBS group before liberalization. Consequently, this

proves to be problematic for the calculation of added value in the next section, and is one of the main reasons why a focus is put on the period 2010 – 2015, as detailed annual accounts are available for these years. Table 12 contains the total purchases of raw materials, consumables, services and other goods for the NMBS group in this period. The last column indicates the share of this post in the total operational costs of the NMBS group. It can be seen that before the internal reorganization in 2004, the purchased goods and services fluctuated between 20% to 30% of the total operational costs of the company. After the internal reorganization in 2004, this share goes up to well above 50%, as the total operating cost went down while the cost for raw materials, consumables, services and other goods increased.

TABLE 12: RAW MATERIALS, CONSUMABLES, SERVICES AND OTHER GOODS IN EUR (2005 – 2009)

	Total NMBS freight raw materials, consumables, services and other goods (60/61)	Total NMBS raw materials, consumables, services and other goods	% of total NMBS operational costs
1990	Not available	€ 457,876,257	18.12%
1991	Not available	€ 553,700,318	20.26%
1992	Not available	€ 695,797,756	23.65%
1993	Not available	€ 1,125,523,860	32.75%
1994	Not available	€ 1,066,746,095	31.42%
1995	Not available	€ 593,475,654	20.30%
1996	Not available	€ 660,863,330	21.89%
1997	Not available	€ 676,085,252	21.95%
1998	Not available	€ 719,660,186	22.50%
1999	Not available	€ 779,285,131	23.58%
2000	Not available	€ 884,078,863	25.19%
2001	Not available	€ 865,570,840	24.07%
2002	Not available	€ 952,924,800	24.27%
2003	Not available	€ 884,318,800	23.18%
2004	Not available	Not available	Not available
2005	Not available	€ 1,069,000,000	53.34%
2006	Not available	€ 1,176,600,000	55.26%
2007	Not available	€ 1,227,000,000	55.52%
2008	Not available	€ 1,288,800,000	53.93%
2009	Not available	€ 1,386,400,000	54.60%

SOURCE: OWN COMPOSITION BASED ON NMBS (1990 – 2009)

When making the assumption that the share of freight operating costs in the total operating costs is equal to the share of purchases for freight services in the total purchases for freight services, these shares from table 10 can be used to estimate the value of raw materials, consumables, services and other goods purchased for freight services in the period 2005 – 2009. This is shown in Table 13. When multiplying the assumed to be equal share of freight operational costs to the total costs for purchases of raw materials, consumables, services and other goods, the estimated value for these purchases allocated to freight services is obtained in the third column. However, due to the assumption, these numbers should be treated with caution.

TABLE 13: RAW MATERIALS, CONSUMABLES, SERVICES AND OTHER GOODS FOR FREIGHT SERVICES IN EUR (2005 – 2009)

	Share of freight services in total operational costs	Total NMBS raw materials, consumables, services and other goods	Estimated NMBS freight raw materials, consumables, services and other goods (60/61)
2005	22.52%	€ 1,069,000,000	**€ 240,702,340**
2006	21.94%	€ 1,176,600,000	**€ 258,151,367**
2007	21.69%	€ 1,227,000,000	**€ 266,140,530**
2008	22.22%	€ 1,288,800,000	**€ 286,310,118**
2009	17.41%	€ 1,386,400,000	**€ 241,421,627**

SOURCE: OWN COMPOSITION BASED ON NMBS (1990 – 2009)

Table 14 gives an overview of the operational costs of NMBS Logistics Group and B Logistics Group after liberalization in 2010. Consequently, this figure only reflects freight services. This data can be found in the published annual accounts in post 60/61. The table also shows the figures for the three separate entities: NMBS Logistics (B Logistics), Inter Ferry Boats and Xpedys. Due to the transition from the NMBS group towards an independent company, the figure for NMBS Logistics in 2010 is only very limited. Therefore, figures for 2010 should be interpreted with caution in the next section. It can be seen that the major part of the total operational costs is allocated to the purchase of raw materials, consumables, services and other goods, with an average share of almost 90%. This is much higher compared to the 50% allocation before liberalization. In line with the operational costs, the cost for purchased goods and services also tends to decrease over the period 2010 – 2015.

TABLE 14: RAW MATERIALS, CONSUMABLES, SERVICES AND OTHER GOODS IN EUR (2010 – 2015)

	(NM)B(S) Logistics Group			
	Total costs for raw materials, consumables, services and other goods (60/61)	*(NM)B(S) Logistics*	*Inter Ferry Boats*	*Xpedys*
2010	**€ 212,509,299**	*€ 29,234*	*€ 144,480,675*	*€ 67,999,390*
2011	**€ 720,521,624**	*€ 443,802,532*	*€ 186,216,533*	*€ 90,502,559*
2012	**€ 658,957,280**	*€ 418,390,693*	*€ 146,212,025*	*€ 94,354,562*
2013	**€ 585,958,572**	*€ 355,904,010*	*€ 145,473,375*	*€ 84,581,187*
2014	**€ 541,316,035**	*€ 315,255,669*	*€ 132,906,025*	*€ 93,154,341*
2015	**€ 540,492,232**	*€ 311,374,533*	*€ 129,604,908*	*€ 99,512,791*

SOURCE: OWN COMPOSITION BASED ON B LOGISTICS (2011–2016), INTER FERRY BOATS (2011–2016), XPEDYS (2011–2016)

2.1.9. Gross Wages (62)

The retribution for labour or gross wages is another important parameter for the calculation of added value, according to the approaches defined in the previous section. Unfortunately, the same issue rises for the period before liberalization as in the previous section.

Table 15 is estimating the gross wages allocated to freight services, based on a number of assumptions. Within the statistical pocketbooks of NMBS, the average gross wage per month for the total company is found. When it is assumed that this average gross wage per month is applicable to freight services, this amount can be multiplied by the workforce allocated to freight services in table 3. This includes a second assumption, namely that the allocation of workforce to freight services is representing the reality. Within the previous section on employment, it has been discussed however that this is not the case, and the allocation of FTE to freight is underestimated. This can be seen as well when calculating the share of the obtained gross wage for freight services in the total amount of gross wage costs of the company. For the period 1993 – 2003, between 0.5% to 1% of the total cost of labour is allocated to freight, whereas freight services generate up to 28% of the company's revenue. After the start of the internal reorganization in 2014, the share of freight labour costs increases to 15%. However this share drops again to 10% by 2009. Due to these assumptions, it is difficult to use these figures in the calculation approaches discussed in the first section.

TABLE 15: GROSS WAGES ESTIMATION IN EUR (1990 – 2009)

	Average gross wage per month	Gross wage for NMBS freight services (62)	Total NMBS gross wage	% Freight
1990	€ 3,316	**Not available**	€ 1,836,475,386	Not available
1991	€ 3,400	**Not available**	€ 1,947,024,273	Not available
1992	€ 3,446	**Not available**	€ 2,015,860,343	Not available
1993	€ 3,490	**€ 4,062,360**	€ 2,084,485,065	0.19%
1994	€ 3,519	**€ 9,881,352**	€ 2,103,976,301	0.47%
1995	€ 3,611	**€ 11,396,316**	€ 2,126,122,246	0.54%
1996	€ 3,667	**€ 12,497,136**	€ 2,110,752,338	0.59%
1997	€ 3,762	**€ 12,369,456**	€ 2,141,444,623	0.58%
1998	€ 3,804	**€ 12,188,016**	€ 2,173,741,233	0.56%
1999	€ 4,476	**€ 25,244,640**	€ 2,219,608,674	1.14%
2000	€ 4,628	**€ 25,491,024**	€ 2,306,832,197	1.11%
2001	€ 4,665	**€ 25,806,780**	€ 2,392,004,138	1.08%
2002	€ 3,680	**€ 20,004,480**	€ 2,535,963,200	0.79%
2003	€ 4,529	**€ 24,402,252**	€ 2,542,875,100	0.96%
2004	Not available	**Not available**	Not available	Not available
2005	€ 4,400	**€ 146,414,400**	€ 934,000,000	15.68%
2006	€ 4,334	**€ 139,329,432**	€ 952,400,000	14.63%
2007	€ 4,394	**€ 137,250,984**	€ 982,100,000	13.98%
2008	€ 4,354	**€ 130,620,000**	€ 1,100,600,000	11.87%
2009	€ 4,448	**€ 117,160,320**	€ 1,151,700,000	10.17%

SOURCE: OWN COMPOSITION BASED ON NMBS (1990 – 2009)

Table 16 gives an overview of the gross wages of NMBS Logistics Group and B Logistics Group after the liberalization in 2010. Consequently, this figure only reflects freight services. This data can be found in the published annual accounts in post 63. The table also shows the figures for the three separate entities: NMBS Logistics (B Logistics), Inter Ferry Boats and Xpedys. Due to the transition from the NMBS group towards an independent company, the figure for NMBS Logistics in 2010 is considerably lower. Therefore, figures for 2010 should be interpreted with caution in the next section. Gross wage costs are increasing over the period 2010 – 2015, as the number of FTE is also steadily increasing over the same period.

TABLE 16: GROSS WAGES IN EUR (2010 – 2015)

		(NM)B(S) Logistics Group		
	Total Gross Wages (62)	*(NM)B(S) Logistics*	*Inter Ferry Boats*	*Xpedys*
2010	**€ 18,038,069**	*€ 0*	*€ 15,773,623*	*€ 2,264,446*
2011	**€ 28,009,099**	*€ 13,235,706*	*€ 11,323,094*	*€ 3,450,299*
2012	**€ 35,889,262**	*€ 22,118,814*	*€ 9,431,327*	*€ 4,339,121*
2013	**€ 37,970,607**	*€ 27,413,305*	*€ 7,488,644*	*€ 3,068,658*
2014	**€ 42,059,888**	*€ 30,971,969*	*€ 5,810,224*	*€ 5,277,695*
2015	**€ 47,970,305**	*€ 36,568,133*	*€ 5,430,118*	*€ 5,972,054*

SOURCE: OWN COMPOSITION BASED ON B LOGISTICS (2011–2016), INTER FERRY BOATS (2011–2016), XPEDYS (2011–2016)

Within the previous section on raw materials, consumables, services and other goods, it was noticed that 90% of the total freight operational costs is allocated to the purchases of these inputs, whereas gross wages in table 16 only represent around 6% of the total freight operational costs. In the period 2005 - 2009, before liberalization, gross wages for freight activities represented more than a quarter of the total freight operational costs, with only 10% to 15% of the FTE and total gross wages allocated to freight, indicating once again that joint costs were not divided in a representative way over the different activities performed within the company.

2.1.10. Depreciations (630)

Data on depreciations is not available for the period 1990 - 2004. Consistent with the approaches discussed for the calculation of added value, only the gross variant could be considered for this period, as the depreciation values are needed to obtain the net value. For the period 2005 – 2015, depreciation values for freight services can be identified and are shown in table 17.

TABLE 17: DEPRECIATIONS IN EUR (2005 – 2015)

	Total freight Depreciation of and amounts written off formation expenses, intangible and tangible fixed assets (630)
2005	€ 44,000,000
2006	€ 41,700,000
2007	€ 41,300,000
2008	€ 33,100,000
2009	€ 26,000,000
2010	€ 12,129,979
2011	€ 33,014,828
2012	€ 28,937,510
2013	€ 26,078,883
2014	€ 26,468,995
2015	€ 25,793,829

SOURCE: OWN COMPOSITION BASED ON NMBS (1990 – 2009), B LOGISTICS (2011 – 2016), INTER FERRY BOATS (2011 – 2016), XPEDYS (2011 – 2016)

2.1.11. Provisions for risks and costs (635/7)

For the adapted approach discussed in section 1.2.4, the provisions for risks and charges are required. This figure is not available for the period 1990 - 2004. The data found for provisions for risks and costs are shown in table 18 for the period 2005 – 2015. It can be seen that there is a high fluctuation in these amounts, and that values are relatively high, resulting in a significant impact on the added value calculation. This can be explained due to the preparation for liberalization before 2010, as well as the effects of the transition period after 2010. In the future, this post should stabilize; however, for the observed period it is important to be taken into account when calculating the added value.

TABLE 18: PROVISIONS FOR RISKS AND COSTS IN EUR (2010 – 2015)

	Provisions for risks and charges - Appropriations (635/7)
2005	-€ 22,000,000
2006	-€ 10,800,000
2007	-€ 13,900,000
2008	-€ 12,200,000
2009	€ 300,000
2010	-€ 4,214,073
2011	€ 42,698,244
2012	-€ 36,788,290
2013	-€ 1,482,509
2014	€ 2,197,990
2015	€ 4,390,280

SOURCE: OWN COMPOSITION BASED ON NMBS (1990 – 2009), B LOGISTICS (2011 – 2016), INTER FERRY BOATS (2011 – 2016), XPEDYS (2011 – 2016)

2.1.12. Other operational costs (640/8)

This data is not available in the statistical pocketbooks of NMBS before 2009. Therefore, this will be a missing value in the top-down approaches. Table 19 shows the data of other operational costs for NMBS Logistics and B Logistics for the period 2010 – 2015. This data is coming out of the published annual accounts for these companies.

TABLE 19: OTHER OPERATING COSTS IN EUR (2010 – 2015)

	Total other operational costs (640/8)
2010	€ 1,401,345
2011	€ 2,396,337
2012	€ 2,151,509
2013	€ 3,157,781
2014	€ 3,493,779
2015	€ 2,512,504

SOURCE: OWN COMPOSITION BASED ON B LOGISTICS (2011–2016), INTER FERRY BOATS (2011–2016), XPEDYS (2011–2016)

2.1.13. Taxes (640)

This data is also not available in the statistical pocketbooks of NMBS, which implies that added value cannot be calculated in market prices for this period. Table 20 shows the data of taxes for NMBS Logistics and B Logistics for the period 2010 – 2015. This data is coming out of the published annual accounts for these companies.

TABLE 20: TAXES IN EUR (2010 – 2015)

	Total taxes (640)
2010	€ 325,622
2011	€ 277,632
2012	€ 333,938
2013	€ 491,879
2014	€ 460,049
2015	€ 607,427

SOURCE: OWN COMPOSITION BASED ON B LOGISTICS (2011–2016), INTER FERRY BOATS (2011–2016), XPEDYS (2011–2016)

2.1.14. Rent & Interest (650)

Rent is a part of the goods and services purchased (60/61) without any details available. It will be assumed in this deliverable that rent is zero, although in reality rent is paid for some of the operating buildings. Nevertheless, the impact of this post will be rather limited.

Interest is part of the debt charges (650). For the pre-liberalization period, no detailed information is available for freight services on this post. For NMBS Logistics and B Logistics, it is assumed that interest is equal to the debt charges. These figures are shown in table 22. These values are almost fully accountable to NMBS Logistics and B Logistics, and not to their other two entities, Inter Ferry Boats and Xpedys. It should be noticed that debt charges are included in the bottom-up approach, whereas they are excluded in the top-down approach as they are situated in the financial part of the annual accounts. The bottom-up approach however only focuses on values in the operational part of the annual accounts, leaving the interest or debt charges out of scope. This will have to be taken into consideration when comparing the different approaches in the next section.

TABLE 21: DEBT CHARGES IN EUR (2010 – 2015)

	Total debt charges (650)
2010	€ 332,631
2011	€ 5,341,065
2012	€ 8,202,229
2013	€ 5,424,811
2014	€ 4,575,137
2015	€ 4,528,682

SOURCE: OWN COMPOSITION BASED ON B LOGISTICS (2011–2016), INTER FERRY BOATS (2011–2016), XPEDYS (2011–2016)

2.1.15. Director's entitlements (695)

Before liberalization, this data is not specified, however as this data is not applicable in the annual accounts of NMBS Logistics and B Logistics in the period 2010 – 2015, it can be assumed that these values were also 0 in period 1990 – 2009.

2.1.16. Operational Profit (70/74 – 60/64)

The operational profit can be calculated by subtracting table 10 from table 5 for the period 2005 – 2009, and by subtracting table 11 from table 6 for the period 2010 – 2015. The result is shown in table 21. The figure for 2010 should be treated with caution, as this is a transition year of NMBS Logistics towards an independent company, with only limited data available in the annual accounts. It should be remarked that operational losses are decreasing, implying that operational costs have declined more rapidly compared to the decline in operational income as discussed in the respective sections.

TABLE 21: OPERATIONAL PROFIT IN EUR (2010 – 2015)

	Total freight operational profit (70/74 - 60/64)
2005	-€ 63,500,000
2006	-€ 21,400,000
2007	-€ 18,800,000
2008	-€ 83,800,000
2009	-€ 119,700,000
2010	€ 1,161,748
2011	-€ 117,527,997
2012	-€ 25,926,688
2013	-€ 23,873,238
2014	-€ 21,939,819
2015	-€ 15,252,597

SOURCE: OWN COMPOSITION

2.2. Data usage overview, data availability and data limitations

In the previous sub-sections, an overview is given of all the obtained data for the incumbent rail freight operator in Belgium. Table 22 summarizes which data is needed for the different approaches discussed in section 1. Tables 23 to 25 show which data was found according to the needs of each model, split over the periods 1990 – 2004, 2005 – 2009 and 2010 – 2015. These periods have been identified based on the changes in data and statistics reporting, linked to the internal reorganization started in 2004 and the liberalization of rail freight performed by the incumbent operator in 2010.

The overview of required data for each added value calculation approach in table 22 shows that operational costs are not required. However, this post is used in order to calculate the operational profit. It was also taken into account within the data collection, so as to make comparisons of different sub-posts such as goods and services and gross wages towards the overall total operational freight costs.

TABLE 22: REQUIRED FREIGHT DATA FOR EACH ADDED VALUE APPROACH

		Bottom-Up	Top-Down: NBB	Top-Down: Van Dijk	Top-Down: Adaptation
70/74	Operational income		☑	☑	☑
740	Subsidies	☑	☑	☑	☑
60/64	Operational costs				
60/61	Goods and services		☑	☑	☑
62	Gross wages	☑			
630	Depreciations	☑	☑	☑	☑
635/7	Provisions				☑
640/8	Other oper. costs		☑		☑
640	Taxes	☑	☑	☑	☑
650	Interest	☑			
695	Director ent.		☑		☑
70/74 – 60/64	Operational profit	☑			

SOURCE: OWN COMPOSITION

Table 23 gives an overview of which of the required data is available for each of the four methods, for the period 1990 – 2004. Red indicates that the data is required, but not available. Green indicates that the required data is available for this period. Orange means that data is available, however caution should be used when interpreting the results. This overview allows evaluating which method can be used to make a calculation on the added value.

TABLE 23: AVAILABILITY OF FREIGHT DATA FOR EACH ADDED VALUE APPROACH (1990 – 2004)

		Bottom-Up	Top-Down: NBB	Top-Down: Van Dijk	Top-Down: Adaptation
70/74	Operational income				
740	Subsidies				
60/61	Goods and services				
62	Gross wages	Estimation			
630	Depreciations				
635/7	Provisions				
640/8	Other oper. costs				
640	Taxes				
650	Interest				
695	Director ent.				
70/74 – 60/64	Operational profit				

SOURCE: OWN COMPOSITION

It can be seen in the table that none of the selected approaches can be calculated for the period 1990 – 2004, with the available data found. For the bottom-up approach, the absence of data on operational profit for freight services proves to be the most crucial bottleneck. For the top-down approach, the absence of operational freight income and the purchase of goods and services for the production of rail freight are blocking its calculation.

Table 24 gives a similar overview for the period 2005 – 2010. Due to the internal reorganization, more data on freight activities became available within the statistical yearbooks. Nevertheless, caution should be taken, as the reported allocation of costs and revenues over the different activities does not necessarily reflect the reality of the activities. From the table, it is clear that only the simplified top-down approach by Van Dijk (2017) can be correctly estimated, be it under the previously made assumptions for the value of goods and services purchased. Due to the absence of taxes, only the added value in factor prices can be calculated. For the other two top-down approaches, detailed information on the operating costs categories is missing. For the bottom-

up approach, the estimation of gross wages, the absence of interest figures and the caution that should be used with the obtained operational profit data are considered to be too many fluctuating factors in order to obtain a realistic estimator of the added value.

TABLE 24: AVAILABILITY OF FREIGHT DATA FOR EACH ADDED VALUE APPROACH (2005 - 2009)

		Bottom-Up	Top-Down: NBB	Top-Down: Van Dijk	Top-Down: Adaptation
70/74	Operational income				
740	Subsidies				
60/61	Goods and services		Estimation	Estimation	Estimation
62	Gross wages	Estimation			
630	Depreciations				
635/7	Provisions				
640/8	Other oper. costs				
640	Taxes				
650	Interest				
695	Director ent.				
70/74 – 60/64	Operational profit				

SOURCE: OWN COMPOSITION

Table 25 gives the same overview for the period 2010 - 2015. As rail freight operations of the incumbent operator are performed as an independent company within this period, annual accounts are available. As a consequence, all necessary data is available and all approaches to calculate added value are possible.

TABLE 25: AVAILABILITY OF FREIGHT DATA FOR EACH ADDED VALUE APPROACH (2010 – 2015)

		Bottom-Up	Top-Down: NBB	Top-Down: Van Dijk	Top-Down: Adaptation
70/74	Operational income				
740	Subsidies				
60/61	Goods and services				
62	Gross wages				
630	Depreciations				
635/7	Provisions				
640/8	Other oper. costs				
640	Taxes				
650	Interest				
695	Director ent.				
70/74 – 60/64	Operational profit				

SOURCE: OWN COMPOSITION

In conclusion, it can be stated that historic data on freight activities is not available. Cost and revenue are not consequently allocated over the respective freight services. In addition, the limited amount of allocation that took place is not in line with the realistic share of costs and revenues. As the joint costs and revenues are not correctly divided over the corresponding activities, it becomes difficult to calculate the actual added value of one specific activity, such as rail freight transport, within a company. This proves the importance of a uniform structure of data reporting and statistics management. In order to evaluate economic impact of a sector, it is crucial for companies with multiple services, such as passenger and freight transportation, to clearly define a cost model and allocate costs and revenues consistently and reflecting the actual reality. In addition, this structure should be guarded and remain uniform over the years, even when the company is faced with internal reorganizations and restructuring of business models.

In the next section, the defined methodological approaches and the observed data will be used to calculate the added value, which in itself will be used to estimate the economic indicators that have been defined in the first section. For these calculations, focus will be put on the period 2010 – 2015, as for this period, most detailed information is available. For the period 2005 – 2009, the top-down approach will be presented and discussed, taking into account the limitations of the data as explained above.

3. RESULTS AND DISCUSSION

Within this section, the results for added value and the economic indicators will be presented and discussed. In a first part, this will be done for the incumbent rail freight operator. In a second section, the position of other rail freight operators in Belgium will be discussed. As detailed performance data is not available for these companies separately, the revenue of all other competitors grouped together can be used to calculate some estimations. In a final section, the impact of the worst-case scenario exploration from deliverable 1.3 will be discussed.

3.1. The case of (NM)B(S) Logistics Group (Lineas Group)

As previously mentioned, the observed data in section 2 is for the incumbent rail freight operator in Belgium. As production data became confidential as from 2010, no market shares based on production values can be calculated. Before 2010, NMBS Logistics was holding a market share of up to 90% in Belgium, measured in train-kilometres travelled annually (Deville & Verdun, 2012). Based on the revenues of the different companies in the annual accounts, a market share of 84% can be estimated for B Logistics in 2015 (B Logistics, 2015; Inter Ferry Boats, 2015, Xpedys, 2015). It is clear that the incumbent rail freight operator still holds a large share of its dominance on the Belgian rail freight market. As such, calculating the added value and the economic indicators of this company will already give a good indication of the total impact on the Belgian economy.

3.1.1. Added value

Within this section, the added value of the incumbent operator will be calculated and discussed for the period 2005 – 2010, based on the four different approaches. Table 26 gives an overview of the obtained results, when the observed data is substituted in the definitions of each approach. Based on the data from section two, the following formulas are used to calculate the gross added value figures in factor costs:

Bottom-up approach = *(70/74 – 60/64) + 62 + 650 + 630* (4)

Top-down approach (NBB) = *70/74 – 60/61 – 640/8 – 695* (5)

Top-down approach (Van Dijk) = *70/74 – 60/61* (6)

Top-down approach (adaptation) = *70/74 – 60/61 – 635/7 – 640/8 – 695* (7)

The added value figures in market prices are obtained by adding taxes (640) and subtracting subsidies (740). The net added value figures are obtained by subtracting depreciations (630).

Table 26 indicates the differences in added value, between the different approaches and the different concepts of gross and net added value, as well as the added value expressed in factor prices and market prices. It should be noted that gross added value figures are positive as from 2013. Net added value figures are positive as from 2015, indicating an upward trend of the companies' added value levels. This corresponds with the actions taken by B Logistics as from 2010 in order to become a profitable and growing independent rail

freight operator. The decrease of the gross added value in market prices compared to the gross added value in factor prices can be explained by the higher subsidies compared to the taxes. Subsidies are artificially decreasing the market price and should therefore be taken into account when calculating the added value in market prices. The net added value figures are lower compared to their corresponding gross added value figures due to the inclusion of depreciation values. This reasoning can be compared with the EBITDA and EBIT indicators for profitability of a company.

TABLE 26: ADDED VALUE (2010 – 2015)

BOTTOM-UP APPROACH	GROSS ADDED VALUE (factor prices)	NET ADDED VALUE (factor prices)	GROSS ADDED VALUE (market prices)	NET ADDED VALUE (market prices)
2010	€ 31,662,427	€ 19,532,448	€ 8,796,556	-€ 3,333,423
2011	-€ 51,163,005	-€ 84,177,833	-€ 73,021,104	-€ 106,035,932
2012	€ 47,102,313	€ 18,164,803	€ 29,025,332	€ 87,822
2013	€ 45,601,063	€ 19,522,180	€ 21,484,226	-€ 4,594,657
2014	€ 51,164,201	€ 24,695,206	€ 26,718,044	€ 249,049
2015	€ 63,040,219	€ 37,246,390	€ 40,450,969	€ 14,657,140

TOP-DOWN APPROACH (NBB)	GROSS ADDED VALUE (factor prices)	NET ADDED VALUE (factor prices)	GROSS ADDED VALUE (market prices)	NET ADDED VALUE (market prices)
2010	€ 27,290,177	€ 15,160,198	€ 4,424,306	-€ 7,705,673
2011	-€ 11,717,483	-€ 44,732,311	-€ 33,575,582	-€ 66,590,410
2012	€ 2,153,590	-€ 26,783,920	-€ 15,923,391	-€ 44,860,901
2013	€ 39,145,683	€ 13,066,800	€ 15,028,846	-€ 11,050,037
2014	€ 49,074,387	€ 22,605,392	€ 24,628,230	-€ 1,840,765
2015	€ 62,609,231	€ 36,815,402	€ 40,019,981	€ 14,226,152

TOP-DOWN APPROACH (Van Dijk)	GROSS ADDED VALUE (factor prices)	NET ADDED VALUE (factor prices)	GROSS ADDED VALUE (market prices)	NET ADDED VALUE (market prices)
2010	€ 28,691,522	€ 16,561,543	€ 5,825,651	-€ 6,304,328
2011	-€ 9,321,146	-€ 42,335,974	-€ 31,179,245	-€ 64,194,073
2012	€ 4,305,099	-€ 24,632,411	-€ 13,771,882	-€ 42,709,392
2013	€ 42,303,464	€ 16,224,581	€ 18,186,627	-€ 7,892,256
2014	€ 52,568,166	€ 26,099,171	€ 28,122,009	€ 1,653,014
2015	€ 65,121,735	€ 39,327,906	€ 42,532,485	€ 16,738,656

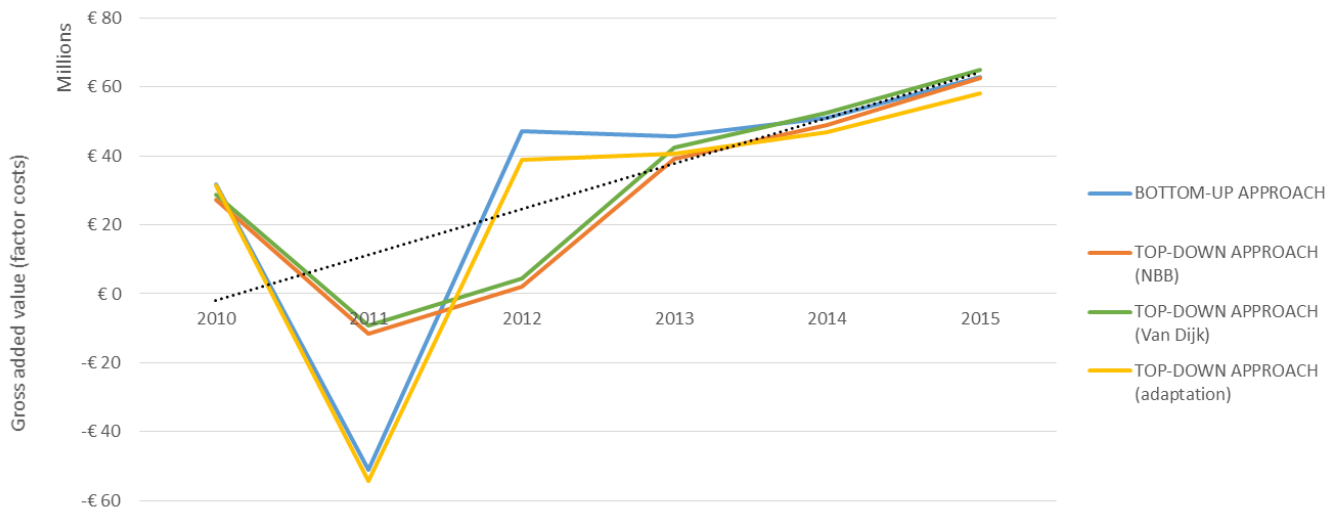
TOP-DOWN APPROACH (adaptation)	GROSS ADDED VALUE (factor prices)	NET ADDED VALUE (factor prices)	GROSS ADDED VALUE (market prices)	NET ADDED VALUE (market prices)
2010	€ 31,504,250	€ 19,374,271	€ 8,638,379	-€ 3,491,600
2011	-€ 54,415,727	-€ 87,430,555	-€ 76,273,826	-€ 109,288,654
2012	€ 38,941,880	€ 10,004,370	€ 20,864,899	-€ 8,072,611
2013	€ 40,628,192	€ 14,549,309	€ 16,511,355	-€ 9,567,528
2014	€ 46,876,397	€ 20,407,402	€ 22,430,240	-€ 4,038,755
2015	€ 58,218,951	€ 32,425,122	€ 35,629,701	€ 9,835,872

SOURCE: OWN COMPOSITION

From graph 1, it can be seen that the bottom-up approach and the adapted top-down approach follow a similar trend. The top-down approach following the definition of the National Bank of Belgium is following a similar trend as the simplified top-down approach provided by Van Dijk (2017), showing that the latter is clearly an overestimation of the gross and net added value in factor and market prices. More importantly, it is clear that all four methods are consistent in the overall trend, giving a clear indication of the evolution of added value figures of the incumbent rail freight operator. Over the period 2010 – 2015, this trend is slightly upward, with

a clear set-back in 2011. This can be explained due to the effects of the transition towards an independent organization. Multiple sources within the company confirmed that all charges linked to this transition have been taken into account during this accounting year. It is no coincidence that this drop is mainly reflected in the bottom-up approach and the adapted top-down approach, as within these calculations, the provisions for risks and costs are excluded from the added value. Table 18 shows that this value for 2011 rises above 40,000 EUR (use) and drops below -30,000 EUR (write-back) in 2012. This results in an increased cost factor in 2011 (provision is used) and an artificial revenue in 2012 (write-back). Within the top-down approach according to NBB (2007) and Van Dijk (2017), this amount is not included as a part of the added value, as it is not substracted from the operational income. Within the bottom-up approach, this amount is taken into account in the operational profit calculation, and as such an integral part of the added value calculation. Therefore, an adapted top-down approach is calculating where these provisions are also included in the added value calculation, leading to a drop in added value for 2011, as the additional cost is taken into consideration, and a rise in added value for 2012, as the artificial revenue is taken into consideration. After this transition period, it can be seen that all four approaches lead to similar results.

GRAPH 1: ANNUAL GROSS ADDED VALUE (FACTOR COSTS IN MIO EUR)



SOURCE: OWN COMPOSITION

Looking at the data for the period 2005 – 2009, the Van Dijk top-down approach can be used to estimate added value figures in factor prices. This is however an estimation that needs to be used with caution, due to the data limitations expressed in previous sections. The results are shown in table 27.

TABLE 27: ADDED VALUE IN FACTOR PRICES (2005 - 2009)

TOP-DOWN APPROACH (Van Dijk)	GROSS ADDED VALUE (factor prices)	NET ADDED VALUE (factor prices)
2005	€ 147,097,660	€ 103,097,660
2006	€ 187,648,633	€ 145,948,633
2007	€ 194,459,470	€ 153,159,470
2008	€ 160,789,882	€ 127,689,882
2009	€ 81,078,373	€ 55,078,373

SOURCE: OWN COMPOSITION

When comparing these figures with the added value in factor prices for the period 2010 – 2015, it can be seen that they are significantly higher. This can be linked to the observation that allocation of joint costs over the different services was not representative within NMBS during this period. As a consequence, an overestimation of the added value for freight services is obtained. Nevertheless, it can be seen that a downward trend is noticed, reflecting the internal reorganization that was started in 2004.

3.1.2. Economic indicators

Within this section, the obtained added value figures will be used to calculate and discuss the economic indicators as explained in section 1.1, for the focus period 2010 – 2015. For the top-down approach by Van Dijk, the period 2005 – 2015 is analysed, be it with caution. Three economic indicators are calculated, according to their respective formula: (1) Added value per FTE, (2) Added value per production unit and (3) Added value range. The obtained gross added values in factor prices from table 26 are combined with the employment values in table 4, the production values in table 1 and the revenue values in table 8. The results are shown in table 28.

TABLE 28: ECONOMIC INDICATORS (2005 - 2009)

BOTTOM-UP APPROACH	Gross added value per FTE (1)	Gross added value per production unit (2)	Gross added value range (3)
2010	138,870.29 €/FTE	0.58 €c/tkm	15.35%
2011	-148,729.67 €/FTE	-0.91 €c/tkm	-7.75%
2012	97,925.81 €/FTE	0.89 €c/tkm	7.67%
2013	90,299.13 €/FTE	0.95 €c/tkm	7.85%
2014	77,639.15 €/FTE	1.11 €c/tkm	9.20%
2015	92,706.20 €/FTE	1.28 €c/tkm	11.05%

TOP-DOWN APPROACH (NBB)	Gross added value per FTE (1)	Gross added value per production unit (2)	Gross added value range (3)
2010	119,693.76 €/FTE	0.50 €c/tkm	13.23%
2011	-34,062.45 €/FTE	-0.21 €c/tkm	-1.78%
2012	4,477.32 €/FTE	0.04 €c/tkm	0.35%
2013	77,516.20 €/FTE	0.82 €c/tkm	6.74%
2014	74,467.96 €/FTE	1.06 €c/tkm	8.82%
2015	92,072.40 €/FTE	1.27 €c/tkm	10.97%

TOP-DOWN APPROACH (Van Dijk)	Gross added value per FTE (1)	Gross added value per production unit (2)	Gross added value range (3)
2005	53,046.40 €/FTE	5.75 €c/tkm	38.78%
2006	70,044.28 €/FTE	7.43 €c/tkm	43.38%
2007	74,705.90 €/FTE	7.56 €c/tkm	43.30%
2008	64,315.95 €/FTE	6.13 €c/tkm	37.05%
2009	36,937.76 €/FTE	3.93 €c/tkm	26.39%
2010	125,840.01 €/FTE	0.52 €c/tkm	13.91%
2011	-27,096.35 €/FTE	-0.17 €c/tkm	-1.41%
2012	8,950.31 €/FTE	0.08 €c/tkm	0.70%
2013	83,769.24 €/FTE	0.88 €c/tkm	7.28%
2014	79,769.60 €/FTE	1.14 €c/tkm	9.45%
2015	95,767.26 €/FTE	1.33 €c/tkm	11.42%

TOP-DOWN APPROACH (adaptation)	Gross added value per FTE (1)	Gross added value per production unit (2)	Gross added value range (3)
2010	138,176.54 €/FTE	0.58 €c/tkm	15.28%
2011	-158,185.25 €/FTE	-0.96 €c/tkm	-8.25%
2012	80,960.25 €/FTE	0.73 €c/tkm	6.34%
2013	80,451.87 €/FTE	0.85 €c/tkm	6.99%
2014	71,132.62 €/FTE	1.02 €c/tkm	8.43%
2015	85,616.10 €/FTE	1.18 €c/tkm	10.21%

SOURCE: OWN COMPOSITION

The gross added value in factor prices is used to calculate the different parameters. As seen in table 26, there are the highest added value figures and are not corrected for taxes and subsidies. However, as data on subsidies is not transparent, the gross added value better reflects the reality, when it is taking into account that this is a value in factor prices and not in market prices. The same reasoning is followed for the net values, as depreciations are mutable over the years, impacting the net added value figures. As such, the gross added value figures give a better reflection of reality as long as it is taken into account these are not net values when interpreting the results.

Graph 2 shows the gross added value (in EUR factor prices) per unit of workforce (in FTE). It should be taken into account that data for 2010 is incomplete and 2011 and 2012 are transition years. Nevertheless, a slightly positive trend can be found for the period 2005 – 2010, indicated by the black dotted line. When taking into account only the values of the period 2010 – 2015, indicated by the grey dotted line, the slope of the trend line increases, indicating a clearly positive trend of the productivity and competitive position of the incumbent rail freight operator in Belgium in terms of production factor labour (Vanstraelen, 2005). Especially when taking into account the remark concerning the underestimated allocation of FTE towards freight activities in the period before 2010, this graph shows the positive evolution of this indicator and the increasing importance of rail freight transportation on the Belgian economy.

GRAPH 2: GROSS ADDED VALUE PER UNIT OF WORKFORCE (EUR/FTE)

SOURCE: OWN COMPOSITION

Graph 3 shows the gross added value (in EUR factor prices) per production unit (in tkm). This indicator is not solely focussing on the production factor labour, but is taking the final production into account that is realised with all production factors, labour and capital goods included. It can be interpreted as the unit value added and shows the sum of the unit components that are reflected within the added value calculation, being in general the unit profit, the unit depreciation cost and the unit labour cost. For the period 2010 – 2015, similar conclusions can be made as for the employment indicator. However, for the period 2005 – 2009, higher values are estimated. Nevertheless, these figures should be interpreted with care, as the joint costs are not accounted to the freight services accordingly. As such, the estimated value for purchased goods and services would increase, resulting in a lower amount of gross added value for this period. Within the indicator per unit of workforce, this effect is partially neutralized as the gross added value is divided by the number of FTE, which

is also underestimated. The current indicator takes into account production values, which are more accurately reflecting reality. Therefore, the trend line for the period 2005 – 2015 shows a declining slope, however when looking at the period 2010 – 2015, a positive slope can be identified. Due to this structural break it is better to look at the evolution of the indicator within the two period separately. For the pre-liberalisation period, is it clear that the financial and economic crisis had a big effect in the years 2008 and 2009. Production values and operational income dropped significantly by one third of the total value, whereas the cost for inputs to realize this production and the corresponding revenue dropped by only 10%. This explains the decrease in added value per unit of production. When looking at the period 2010 – 2015, it is noticed in graph 3 that this process was reversed after the transition, and added value per tkm is steadily rising, showing improved performance.

GRAPH 3: GROSS ADDED VALUE PER UNIT OF PRODUCTION (€C/TKM)

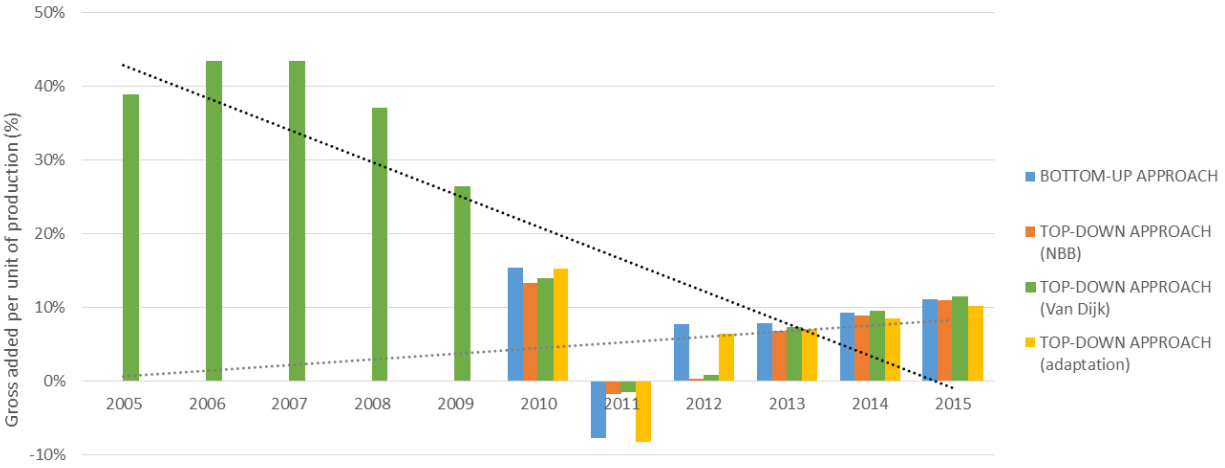
SOURCE: OWN COMPOSITION

Graph 4 shows the gross added value range percentage. This indicator is the obtained gross added value (in EUR factor prices) per EUR revenue and reflects the level of vertical integration of the company. The higher the amount of the gross added value range, the higher the level of vertical integration. Vertical integration indicates how much the supply chain is owned by the observed company (Vanstraelen, 2015) and is expressed as a share of the total revenue that is generated by the company. The same conclusions apply as for the previous indicators. In the period before 2010, revenue is rapidly decreasing due to the financial and economic crisis; however, the identified gross added value is declining at a faster rate, decreasing the added value margin. As the company becomes more reliant on external inputs for the creation of their goods or services, vertical integration is decreasing and less added value is generated. After the transition period, B Logistics turned around this process and is increasing its vertical integration, resulting in more added value generated compared to a decrease in revenue.

This remark can be linked to the conclusions made in deliverable 3.2, where a high indirect impact has been identified under assumptions, when taking into account the economic spill over effects throughout the whole supply chain B Logistics is using to provide its production with the necessary inputs. Taking into account the assumptions listed in deliverable 3.2, it is found that for each EUR of additional final rail freight demand, the total output for the Belgian economy is rising by 2.19 EUR. This indicator on gross added value range is looking only at the direct impact of the company on its suppliers and shows that for each EUR of revenue, comparable by the concept of final demand, an added value of more than 0.10 EUR is generated, resulting in a total direct

impact of 1.10 EUR generated by the company itself. Comparing the two, it can be stated that spill over effects, created by the need of inputs from the suppliers of the investigated company, account for 1.09 EUR. Nevertheless, this amount is an overestimation due to the used assumptions in both deliverables and should be treated with care. Nonetheless, it is clear that rail freight transport has a clearly positive impact on the Belgian economy and its importance is rising over the last years. In the next section, a simplified yet similar analysis will be performed for the remaining rail freight operators in Belgium, in order to be able to make a comparison and get a clear overview of the total impact of rail freight transport on the Belgian economy.

GRAPH 4: GROSS ADDED VALUE RANGE (%)



SOURCE: OWN COMPOSITION

3.2. Other rail freight operators in Belgium

After liberalization started in 2007, new players entered the rail freight transport market in Belgium. For the observed focus period 2010 - 2015 in the previous section, the main competitors of B Logistics can be identified as Captrain Belgium, Crossrail, Railtraxx and Trainsport. As indicated in the scenarios in deliverable 1.3, not all licenced operators are active on the network (Troch et. Al., 2015). In addition, SNCF Fret is operating through Captrain Belgium and Europorte and CFL Cargo have no settlement on Belgian territory, so there is no direct impact on the Belgian economy as such. DB schenker is cooperating with B Logistics within COBRA for the rail corridor operations, but is not reporting additional rail operation activities within Belgian annual accounts. Therefore, these competitors are left out of this analysis.

As most of these companies were founded in 2007, most data is available in their annual accounts as from this date. Therefore, the top-down approach by Van Dijk (2017) can be applied as a minimum of data is required. In addition, the FTE and revenue are collected for these companies for the period 2007 – 2015, in order to be able to calculate the economic indicators. Due to reasons of confidentiality, no production values are available, not even at aggregated level. Table 29 gives an overview of the collected data for active competitors of the incumbent rail freight operator for the period 2007 – 2015.

To collect data for the main competitors, the published annual accounts are used. In order to make it possible to compare and use this data, a number of additional assumptions and corrections is to be made. For Crossrail (2007 – 2016), the terms of accounting years at the start of the observed period is different from a standard year. In 2007, the annual accounts were published for the period July 2006 - June 2007. In 2009, the annual accounts for the period July 2007 – December 2008 were issued. In order to use this data, the observed

TABLE 29: DATA OF MAIN RAIL FREIGHT COMPETITORS IN BELGIUM (2007 – 2015)

	Operational income (70/74)								
	2007	2008	2009	2010	2011	2012	2013	2014	2015
Captrain Belgium	€ 3,144,859.00	€ 6,235,314.00	€ 10,395,324.00	€ 10,706,805.00	€ 18,983,131.00	€ 15,337,258.00	€ 14,327,493.00	€ 14,178,679.00	€ 16,103,639.00
Crossrail	€ 43,329,055.33	€ 51,713,596.67	€ 58,080,402.00	€ 64,966,693.00	€ 68,412,654.00	€ 66,608,095.00	€ 70,445,634.00	€ 78,170,402.00	€ 85,671,260.00
Railtraxx	€ 5,565.00*	€ 3,170.00*	€ 8,586.00*	€ 14,953.00*	€ 136,745.00*	€ 478,004.00*	€ 1,449,690.00*	€ 2,495,960.00*	€ 3,567,736.00*
Trainsport	€ 45,785.00*	€ 441,612.00*	€ 448,482.00*	€ 5,339,641.00	€ 5,461,452.00	€ 4,459,803.00	€ 1,025,292.00*	€ 1,658,899.00*	€ 1,899,701.00*
TOTAL	€ 46,525,264.33	€ 58,393,692.67	€ 68,932,794.00	€ 81,028,092.00	€ 92,993,982.00	€ 86,883,160.00	€ 87,248,109.00	€ 96,503,940.00	€ 107,242,336.00

	Total costs for raw materials, consumables, services and other goods (60/61)								
	2007	2008	2009	2010	2011	2012	2013	2014	2015
Captrain Belgium	€ 2,162,676.00	€ 4,486,990.00	€ 8,580,784.00	€ 11,879,240.00	€ 17,904,093.00	€ 14,817,881.00	€ 14,660,917.00	€ 12,468,409.00	€ 11,472,447.00
Crossrail	€ 37,254,831.67	€ 45,209,881.33	€ 48,910,270.00	€ 55,057,151.00	€ 59,210,558.00	€ 54,035,451.00	€ 56,753,298.00	€ 63,387,103.00	€ 70,829,441.00
Railtraxx	€ 0.00*	€ 0.00*	€ 0.00*	€ 0.00*	€ 0.00*	€ 0.00*	€ 0.00*	€ 0.00*	€ 0.00*
Trainsport	€ 0.00*	€ 0.00*	€ 0.00*	€ 4,696,894.00	€ 4,226,265.00	€ 3,200,590.00	€ 0.00*	€ 0.00*	€ 0.00*
TOTAL	€ 39,417,507.67	€ 49,696,871.33	€ 57,491,054.00	€ 71,633,285.00	€ 81,340,916.00	€ 72,053,922.00	€ 71,414,215.00	€ 75,855,512.00	€ 82,301,888.00

	Workforce (FTE)								
	2007	2008	2009	2010	2011	2012	2013	2014	2015
Captrain Belgium	11 FTE	22 FTE	31 FTE	38 FTE	35 FTE	26 FTE	22 FTE	23 FTE	30 FTE
Crossrail	62 FTE	89 FTE	93 FTE	103 FTE	119 FTE	123 FTE	139 FTE	151 FTE	150 FTE
Railtraxx	1 FTE	1 FTE	1 FTE	1 FTE	2 FTE	7 FTE	10 FTE	21 FTE	34 FTE
Trainsport	5 FTE	9 FTE	13 FTE	16 FTE	15 FTE	16 FTE	13 FTE	18 FTE	20 FTE
TOTAL	79 FTE	121 FTE	138 FTE	158 FTE	171 FTE	172 FTE	184 FTE	213 FTE	234 FTE

	Revenue (EUR)								
	2007	2008	2009	2010	2011	2012	2013	2014	2015
Captrain Belgium	€ 3,127,707.00	€ 6,197,539.00	€ 10,117,915.00	€ 10,495,323.00	€ 18,961,303.00	€ 14,979,197.00	€ 12,221,897.00	€ 13,666,948.00	€ 15,456,344.00
Crossrail	€ 41,427,696.00	€ 48,278,752.00	€ 53,488,447.00	€ 60,139,297.00	€ 66,895,907.00	€ 66,387,304.00	€ 70,089,748.00	€ 77,500,938.00	€ 85,239,910.00
Railtraxx	€ 5,565.00*	€ 3,170.00*	€ 8,586.00*	€ 14,953.00*	€ 136,745.00*	€ 478,004.00*	€ 1,449,690.00*	€ 2,495,960.00*	€ 3,567,736.00*
Trainsport	€ 45,785.00*	€ 441,612.00*	€ 0.00*	€ 5,339,641.00	€ 5,461,452.00	€ 4,459,803.00	€ 1,025,292.00*	€ 1,658,899.00*	€ 1,899,701.00*
TOTAL	€ 44,606,753.00	€ 54,921,073.00	€ 63,614,948.00	€ 75,989,214.00	€ 91,455,407.00	€ 86,304,308.00	€ 84,786,627.00	€ 95,322,745.00	€ 106,163,691.00

* Only gross margin (revenu - supplies) published in the annual accounts, no details on operational income and operational costs

SOURCE: OWN COMPOSITION BASED ON CAPTRAIN BELGIUM (2008 – 2016B), CROSSRAIL (2007 – 2016), RAILTRAXX

figures have been distributed directly proportional with the standard calendar years. As such, estimated numbers for accounting years 2007 and 2008 are shown in table 29. Numbers with an asterisk in the table are observed gross margin figures, and no final operational income or revenue indications, as these data were not available within the annual accounts. As the gross margin is the calculation of the gross added value, this does not pose a direct problem for the calculation of the latter, however in terms of revenue and gross added value range, this figure is a clear underestimation of reality. Nevertheless, the impact of the observed companies where this problem arises is limited and would not significantly shift the outcome.

Table 29 also shows that Crossrail is still the main competitor of the incumbent rail freight operator. When assuming there is no significant price difference between the rail freight operators in Belgium, revenue can be used to explore the market shares. Taking into account the operational revenue of B Logistics in 2015 in table 8, amounting to 570,485,950.00 EUR, it can be deducted from table 29 that the market share of the incumbent rail freight operator amounts to 84.31%. Competition is reaching a market share of 15.69%, with Crossrail claiming the main part with a market share of 12.59%.

In terms of employment, table 29 shows a clearly rising trend for all competitors. It can be seen from the figures that competitors started with limited resources in 2007, but grew significantly in the years after the liberalization started. This is confirmed by the figures on operational income, clearly indicating the competition was not as heavily impacted on by the financial and economic crisis as is the case for the incumbent operator. Operational incomes are steadily rising over the years 2008, 2009 and 2010. This might lead to the conclusion that NMBS Logistics was facing not only the impact of the economic and financial crisis, but was at the same time confronted with increased competition, taking away part of their market share. Combined with the transition towards an independent organization, it shows that these were some difficult and turbulent years for the incumbent operator. The results of these actions were discussed in the previous tables and graphs. In terms of operational costs, a similar rising trend can be observed for the main competitors. The main question however is whether these rising costs undo the increased revenues, or if the created added value also increased. This is shown in table 30.

TABLE 30: GROSS ADDED VALUE AND ECONOMIC INDICATORS OF COMPETITORS (2007 – 2015)

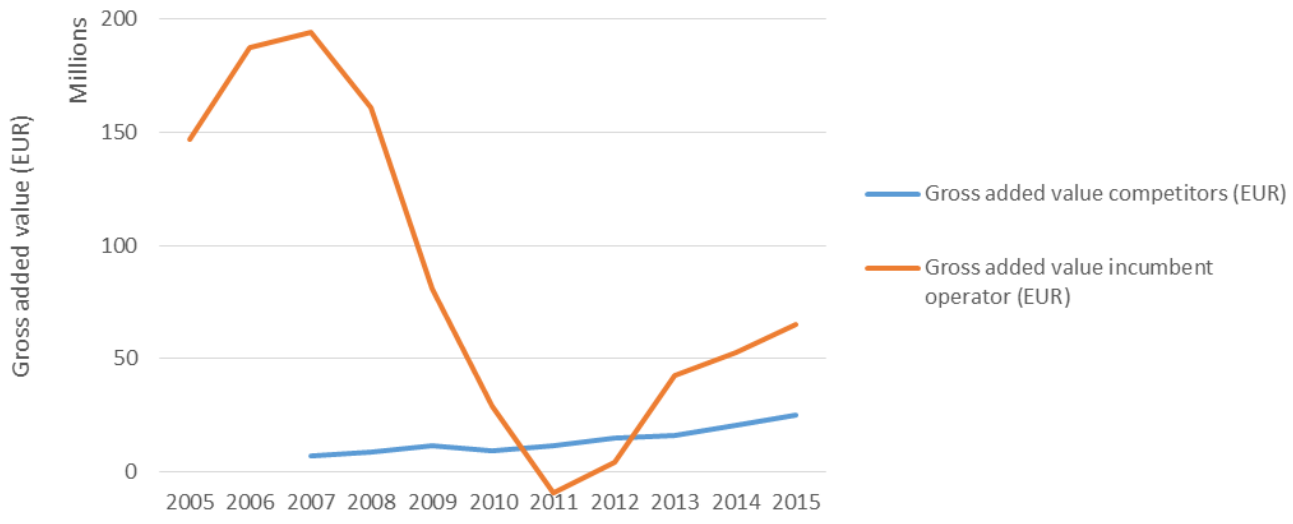
	Gross added value in factor prices (6)	Gross added value per FTE (1)	Gross added value range (3)
2007	€ 7,107,756.67	89,971.60 €/FTE	15.93%
2008	€ 8,696,821.33	71,874.56 €/FTE	15.84%
2009	€ 11,441,740.00	82,911.16 €/FTE	17.99%
2010	€ 9,394,807.00	59,460.80 €/FTE	12.36%
2011	€ 11,653,066.00	68,146.58 €/FTE	12.74%
2012	€ 14,829,238.00	86,216.50 €/FTE	17.18%
2013	€ 15,833,894.00	86,053.77 €/FTE	18.67%
2014	€ 20,648,428.00	96,940.98 €/FTE	21.66%
2015	€ 24,940,448.00	106,583.11 €/FTE	23.49%

SOURCE: OWN COMPOSITION BASED ON CAPTRAIN BELGIUM (2008 – 2016B), CROSSRAIL (2007 – 2016), RAILTRAXX (2008A – 2015B), TRAINSPORT (2008 – 2016)

When deducting the operational costs from the operational income, the gross added value in factor prices according to the top-down approach by Van Dijk (2017) is obtained. It can be seen in table 30 that this added value is increasing over the years, with a limited setback in 2010. Nevertheless, the clearly rising trend indicates that competitors are becoming more efficient and productive in offering rail freight services. This is also shown by the indicators gross added value per FTE and the gross added value range in table 30. Note that the third economic indicator, the gross added value per production unit, cannot be calculated due to confidentiality agreements between the different rail freight operators on providing these production values. As such, this data is not available for competitors of the incumbent rail freight operator. The obtained figures in table 30 can now be compared with the results for the incumbent operator. However, it should be considered that for the period 2005-2009, data of the incumbent rail freight operator is not resulting from the published annual accounts, but collected and calculated under assumptions from the statistical yearbooks.

Graph 5 compares the gross added value in factor prices in EUR of the incumbent operator with the aggregated gross added value of the main competitors in Belgium. This graph shows the upward trend of the total gross added value of the competition in Belgium. The high values for gross added value before the period 2010 – 2015 can be explained by the absence of a correct allocation of joint costs. Nevertheless, after 2012, the gross added value of B Logistics is once again rising above the aggregated value of its main competitors.

GRAPH 5: COMPARISON OF THE GROSS ADDED VALUE (FACTOR PRICES IN EUR): INCUMBENT OPERATOR VS REMAINING COMPETITION)

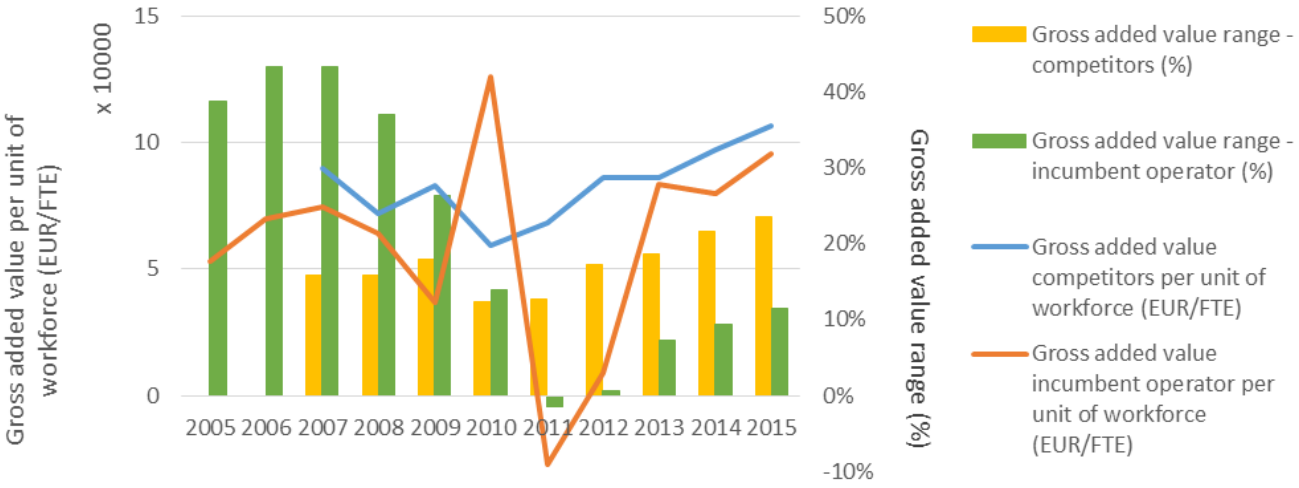


SOURCE: OWN COMPOSITION

As interesting is graph 6, giving an overview of the economic indicators of the incumbent operator and the aggregated values for its main competitors. The gross added value per unit of workforce shows that in general competitors (orange line) are slightly more productive than the incumbent operator (blue line). Higher levels of gross added value are created per FTE. Nevertheless, leaving the two

transition years 2010 and 2011 out of scope, values are following similar trends. This allows concluding that rail freight operations in Belgium have an increasing impact on the economy.

GRAPH 6: COMPARISON OF THE ECONOMIC INDICATORS: INCUMBENT OPERATOR VS REMAINING COMPETITION



SOURCE: OWN COMPOSITION

Looking at the gross added value range, graph 6 shows that competitors have an increased level of vertical integration (yellow bars) compared to the incumbent operator (green bar). Each additional EUR of revenue is resulting in higher levels of added value and has a bigger impact on the economy. Nevertheless, the total impact of the incumbent rail freight operator on the Belgian economy is higher, due to their high market share. In addition, it can also be concluded from graph 6 that for both the competitors and the incumbent rail freight operator, gross added value range values are steadily increasing, indicating an increasing economic impact.

3.3. Worst-case scenario application

Within deliverable 1.3, the worst-case scenario is described as a 'could be' future state of rail freight operations in Belgium were no actions have been taken by 2030 to stimulate the modal shift (Troch et. Al., 2015). Whilst road transportation continues its efforts to become more efficient and technologically advanced, rail freight transport maintains its current existing structures and inefficiencies. Therefore, a growth of only 10% is explored in terms of tkm by 2030. This growth is mainly explained due to the general increase in transport demand, resulting in higher volumes on existing goods flows that are currently transported by rail. However, as transport demand is expected to rise well beyond 10% by 2030, the modal share of rail freight transport is negatively impacted on within this scenario.

Linking the possible state of rail freight transport in this worst-case scenario to the results discussed in previous sections, it is clear that the observed positive trends will not continue. Competition coming from road transport and even IWW will put pressure on the pricing of rail freight transportation, lowering the revenue and as such also profit levels. This has in itself a negative impact on the levels of added value, leading to a decrease in the economic indicators. Also, although production values might

go up by 10%, added value is not expected to increase by the same margin within this scenario, again leading to a downturn of this economic indicator, lowering the impact of rail freight transport on the economy. As transport demand for rail freight activities is explored to rise only by 10%, not only the indirect negative effects on the economic indicators should be taken into account. More obviously, this worst-case scenario also has a direct impact as the total economic benefits of rail freight transportation will only grow by this marginal increase in transport demand. Therefore, the surplus effects of additional rail freight production will be very limited when this scenario is observed. Table 28 and graph 3 show that the added value per production unit is steadily increasing for the incumbent rail freight operator. In 2015, for each realized tkm, an average added value of 1.27 Eurocent is generated, depending on the observed approach to calculate added value. It is clear that the worst-case scenario would have a direct negative effect on the economic impact of rail freight transport, as this added value per tkm would be realized for a lower production value compared to the medium- or best-case scenario. The latter for example explores an increase of 133% in terms of tkm, resulting in an additional impact of 1.27 Eurocent for this additional traffic.

However, this can be concluded under the assumption that the economic indicator value would remain similar for the observed period. As it has been shown in the previous sections, these economic indicators currently tend to vary heavily due to the internal reorganization of NMBS Logistics and B Logistics towards a private and independent company. As this transition period has been almost completed, and the strategy of the company is now shifting towards growth, it can be expected that in a best-case scenario no further cost cutting will take place, stabilizing the growth of the added value per tkm. This can be explained by the anticipation that production is expected to grow, lowering in first instance the economic indicator on added value per production unit. However, the workforce needed to realize this increased production will also rise and a successful business model would also result in an increased operational profit due to the increased production values. These factors will contribute positively towards the added value generated, balancing the indicator over time. Therefore this assumption holds some truth for the best-case scenario, but not for the worst-case scenario. As within this scenario, production values are not expected to increase, the exploration of the cost of electricity and other services is expected to rise for rail freight transportation. As such, the generated added value would decrease and also the value of the economic indicators would decline. Therefore, a lower impact than the currently found 1.27 Eurocent per tkm would be obtained for the already limited production growth that is explored within this scenario.

4. CONCLUSION AND RECOMMENDATIONS

Within this deliverable, the direct impact of rail freight operators in Belgium on the Belgian economy is analysed and discussed. Four different approaches to calculate added value at company level are explored, leading to comparable results for the incumbent rail freight operator Lineas Group (formerly known as NMBS Logistics and B Logistics) and its main competitors. Data collection for these approaches proved to be challenging, as only limited data is publicly available and obligatory publishing of rail freight activities in the annual accounts only took place as from 2010, when the incumbent operator was liberalized.

Historically, the incumbent operator was part of NMBS and only a limited allocation of joint costs was made over the different services performed. This led to an underestimation of workforce allocated to

rail freight activities, as well as an underestimation of the cost for required inputs for these services and as such an overestimation of operational profit levels and corresponding added value for freight services. Also the absence of detailed data makes it difficult to obtain valid and irrefutable values for this period. Nevertheless, looking at the trend of these figures can give a general insight in the evolution of freight activities in Belgium, when the constraints above are taken into account.

From this deliverable, it can be concluded that rail freight transportation in Belgium has a significant and, more importantly, rising direct impact on the Belgian economy. Added value levels of both the incumbent operator, as well as the aggregated values for its main competitors are steadily rising. The corresponding indicators, being the added value per unit of workforce (EUR/FTE), per unit of production (EUR/tkm) and the added value range (EUR/revenue in %) are also rising, indicating an increasing productivity and efficiency of rail freight operators in Belgium. Nevertheless, in order to fully analyse these details, these figures should be compared to a similar analysis for road transportation and IWW transportation in Belgium. As such, the true relative impact of the different land transport modes can be compared. In addition, a benchmark analysis could be performed for European countries, to compare the impact of Belgian rail freight operators with its European competitors.

To conclude this deliverable, an important recommendation can be formulated from the lessons learned within this analysis. Although valuable information has been gathered from the performed calculations, the need for correct, detailed and uniform data on rail freight operations has been clearly stressed upon. Without these data, it is difficult, if not impossible to build a strong case for rail freight transportation activities and its positive impact on both the economy as well as the society in general. Data not being published due to sensitivity and competition can be easily solved by transferring this task to regional or federal levels, and aggregating this data to such levels that no competitive advantage can be reached by any stakeholder involved.

Within Deliverable 3.3, the economic impact of rail freight transport will be investigated at a macro-economic level. Where Deliverables 3.2 and 3.3 focussed on the direct and indirect effects of rail freight transport in terms of employment and added value, the analysis of Deliverable 3.4 will integrate the impact of investments and capacity. In this way, a broader view of the economic impact of rail freight activities on the Belgian economy can be obtained.

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