

Addendum to the 2014 MTRU Report on HGV external costs and charging

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Executive Summary reproduced for reference purposes from the June 2014 MTRU Report: *Heavy Goods Vehicles - do they pay for the damage they cause?*

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Addendum to the 2014 MTRU Report on HGV external costs and charging

1 Introduction

The 2014 MTRU report "*Heavy Goods Vehicles - do they pay for the damage they cause?*" discussed a wide range of issues on costs and charges, including different approaches to track costs. This Addendum covers a smaller number of key issues, in particular the updated values used for marginal external costs used by DfT which are an important benchmark for the different track cost estimates. It is also worth highlighting two key points which have also seen some change in Government policy.

VED, RUL and a new Road Fund?

The first is the issue of "hypothecating" tax revenue for a particular purpose, or to recycle it back to the people who paid it. Obviously the vast majority of tax revenue must go to general Government expenditure on the NHS, welfare, justice, defence, etc. The annual fixed tax on vehicles (Vehicle Excise Duty: VED) has its origins in the Road Board (later the Road Fund) created in 1910. The idea was to make roads self funding. However, in 1936 the fund ceased to be hypothecated and was subsumed into general taxation¹.

In the summer budget of 2015, the idea of hypothecation was once again revived for VED. The income would go towards financing the strategic road network (SRN) from the 2020/21 financial year. This has since been modified to possibly include the major roads controlled by local authorities as well² (approximately doubling the network). At the same time the existing lower rates of VED for the least polluting vehicles were largely reversed, this was designed to maintain the level of income. This would otherwise have fallen as cars became less polluting. Zero emission vehicles are still exempt from VED and thus income will eventually fall unless these are also brought in to VED. Thus the aim of the new fund is to maintain, modernise and expand about 9-10,000 miles of major roads, including the SRN.

For HGVs the main change has been a freezing of standard VED combined with part of this changed to a "Road User Levy" (RUL). This takes the form of a standard daily charge for use of the road network, although blocks of time up to a year can be purchased. It thus bears no direct relation to the amount of use of the network. The main reason for introducing it was to charge foreign HGVs.

Fuel duty

There has never been any suggestion that fuel duty should be hypothecated. However, the fuel duty "escalator" (an above inflation rise in fuel duty every year) was designed to have an impact on vehicle use and on emissions, on grounds of both environmental and economic efficiency. The increases have effectively been deferred since fuel duty has been frozen since 2011.

In economic terms, the road freight users' marginal costs have not reflected true costs and thus higher charges for road use on a distance basis would help to improve total efficiency (in both environmental and economic terms). Thus to improve economic efficiency there should be a direct relationship between the taxes per kilometre travelled and the marginal costs. It is the calculation of these marginal costs which is challenging. For example, what are the costs of road use in terms of construction and maintenance (capital and revenue)? Can all the environmental impacts be costed? Can the downstream costs such as land use impacts be included?

¹ House of Commons Library Briefing Paper Number SN01482, 23 November 2017

² *Proposals for the Creation of a Major Road Network Consultation*, DfT, 23 December 2017

2 Calculating the cost of HGV use

DfT marginal external cost tables

For articulated HGVs DfT produce “Mode Shift Benefit” (MSB) tables, most recently updated in 2015 with estimates for 2020 values at 2015 prices. These calculate the marginal costs so that investment in alternatives which reduce articulated vehicle miles can be tested for value for money.

These showed a rise in costs from the original 2009 estimates, in particular those for road infrastructure and for carbon. The tables below show the comparative values.

Table 1 Mode Shift Benefits 2015 and 2009

Pence per articulated HGV mile

	Motorways (by level of congestion)		Roads			Weighted Average 2015	Weighted Average 2009 report
	High	Low	A	Other			
Congestion	99	24	72	78	57	52.4	
Accidents	0.5	0.5	5.6	5.5	2.7	2.8	
Noise	9	7	8	14	8	7.0	
Pollution	0	0	0.1	0.2	0.1	2.5	
Greenhouse Gases	6	6	7	9	7	3.8	
Infrastructure	7	7	24	171	18	9.0	
Other (roads)³	6	6	6	6	6	6.4	
Gross Total	127.5	50.5	122.7	283.7	98.8	83.9	
Taxation	-31	-31	-32	-40	-32	-34.1	
Marginal cost gap	96.5	19.5	90.7	243.7	66.8	49.8	
Road Tax as % Gross marginal cost	24%	61%	26%	14%	32%	41%	

Sources: Mode Shift Benefit Technical Report, DfT 2009, Mode Shift Benefit Refresh, DfT 2015

It is clear from the above that a very significant amount of the real marginal costs of the largest HGVs

³ These include a range of effects including for the MSB report: up and downstream processes; soil and Water Pollution; nature and Landscape; driver frustration / stress; fear of accidents; community severance (including restrictions on cycling and walking); visual intrusion

is not being met. In 2016 9 billion vehicle miles were run by articulated HGVs, implying a marginal cost shortfall of about £6billion. Clearly these numbers vary a little from year to year according to traffic and the severity of impacts such as pollution or casualties. However they remain substantial and completely unmet. The issue of congestion costs is discussed fully in the original report, they must be included in the marginal cost model if economic efficiency is to be maximised. The Executive Summary and Conclusions from the 2014 MTRU report refers to this and are included as an Annex for reference purposes.

Other sources for HGV costs

The 2014 MTRU report also lists a number of academic, European and DfT sources both for different costing approaches and for different calculations. Since then there have been other analyses, for example the recent RepGraph report for the FTA “*Heavy Goods Vehicles: Do they pay their way? - impacts on road surfaces*”, November 2017.

This report helps to illustrate the need to understand the complexities of costs and revenues. It sets out the total tax take from HGVs including fuel duty and compares it to the overall costs of road expenditure and road maintenance. It also compares this to the Mode Shift Benefit values for infrastructure, but unfortunately uses the old 2009 values which are very significantly lower. Thus this approach has three fundamental flaws:

- Inclusion of fuel duty as though it is hypothecated income which can be counted against HGV external costs – there are no plans for this
- Using an out of date MSB value for infrastructure (50% of current)
- Complete omission of any marginal external costs other than infrastructure.

In addition, it does not distinguish between different types of HGV within a 3.5 to 44 tonne weight range. The largest and heaviest HGVs (mostly but not entirely articulated) cause a great deal more road damage than smaller HGVs (over 100,000 times more than cars), as well as being more likely to be involved in fatal accidents (3 to 5 times), using a significant amount more road space (3 to 5 times) and producing higher volumes of emissions. All this needs to be taken into account when calculating the real costs of HGV use. The MSB values reflect a proportion of these and are calculated for articulated HGVs. They are considered by DfT to approximate to the costs of rigid HGVs of a comparable weight.

The most recent figures for VED income are shown below. This does not include about £50million a year from foreign HGVs over 12 tonnes.

Table 2 Total VED revenue 2016/17

Vehicle Excise Duty classified by vehicle taxation group	Number of vehicles (thousand)	Vehicle excise duty	As % of total
Private and light goods	38,610	5,465	93.0%
Motorcycles, scooters and mopeds	1,406	67	1.1%
Buses and coaches	126	32	0.5%
Goods	475	291	5.0%
Other	2,831	22	0.4%
All vehicles	43,448	5,876	100.0%

Source: Table TSGB1311 (RDE0103) Road taxation revenue in the United Kingdom: 2016/17

Allowing for these factors the revised conclusions should be that the VED income from HGVs is 5% of the total which the Government is planning to hypothecate, and that, allowing for the higher rate of disbenefits and damage of all types, articulated HGVs would fall far short of meeting their fair share of road expenditure. Using the latest MSB values, the VED from articulated vehicles would not even meet their infrastructure costs excluding congestion. Using the full MSB tables, articulated vehicles are on average underpaying by over 60p per mile. Even using the lowest congestion value they under pay by 19.5p per mile.

3 Conclusions

It is clear that the conclusions of the 2014 MTRU report are reinforced by the most recent changes to the DfT calculations for articulated HGV costs. Using vehicle kilometres as the basis for comparing HGV costs to other vehicles (especially cars) is clearly inadequate. HGVs produce, for example, 18% of transport carbon emissions while constituting 5% of road traffic. For road surface damage their impact is over 100,000 greater than for cars. The current consultation on changing the Road User Levy (RUL) needs to address these issues and move to a substantial HGV distance based charge if economic and environmental efficiency is to be optimised. This needs to distinguish between small rigid HGVs and the largest articulated vehicles.

The potential benefits are both to reduce transport costs and third party costs (externalities) including environmental impacts. For example, empty running by HGVs has actually increased over the last decade (from 27% in 2006 to 30% in 2016)⁴ and a distance based charge would encourage greater efficiency. Emphasising marginal costs would mean removing annual charges to operators such as VED. Any reduction in distance travelled would have clear congestion benefits as well as a wide range of health and climate change benefits. Evidence from the Swiss and German HGV distance charging systems shows the significant potential.

If VED were removed from the HGVs covered by any distance based charge (either the current 12 tonnes or heavier) it would cause a slight fall in the income from VED which is to be hypothecated to the Road Fund. This could be covered by a reallocation of an equivalent amount from a distance based RUL. On the other hand there would be a reduction in road maintenance costs (a key factor for local authority roads).

⁴ *Domestic Road Freight Statistics, United Kingdom 2016*, DfT July 2017

Annex

Executive Summary reproduced from the 2014 Report for reference

“Background to costs and charges

There is considerable interest at the European and UK level in charging road freight vehicles in full for their external costs – those that they impose on others that are not included (internalised) in their normal operating costs. Congestion, environmental damage, road wear and accidents are examples of these external costs which are not internalised. In order to include some or all of these costs, there are now different approaches in place across the EU which charge HGVs for road use: motorway tolls in France, Spain and Italy, and “in vehicle” distance charging⁵ in Germany, Austria, the Czech Republic, Slovakia and Switzerland. France is currently preparing to introduce an “ecotax” on HGVs on the non-motorway strategic network.

Without such charging, there is a rationale for balancing grants to modes which have lower marginal external costs. However these do not reduce road freight inefficiencies such as empty running, depot location, port of landing and general logistics practices which would arise from the generation of a freight system working at optimal efficiency.

In the context of changing size and weight limits, for example longer, heavier HGVs (LHVs or “Megatrucks”) proper charging is also seen as critical to extracting the benefits from any increase in capacity. Without this, they are likely to be counter-productive⁶ because they would not be well utilised – i.e. suffer from the load factors already common in the UK. Around 28% of HGV travel is empty running. Elements of such charges would include environmental damage, the cost of building and maintaining roads, and the delay costs imposed on other users.

This report focuses on the question of how taxes and charges can be said to “pay” for HGVs’ external costs, and what those costs may be, using existing values from European and UK research.

It does not revisit the values that are commonly used for environmental damage such as air pollution, although some are clearly inadequate. This extends to the price of carbon, currently insufficient to ensure that reduction targets are met. Thus areas of further research are also identified.

Different approaches to costs and charges

Since the 1960s there have been various attempts to count the real costs of using HGVs on Britain’s roads⁷. Until 1995 an annual statement of costs and income for different vehicle types was published, entitled the “Allocation of Road Track Costs”⁸. This covered elements such as road building and maintenance, lighting, policing and accidents.

Many different weights of HGV had their own ratio of income to cost, partly because damage to road surfaces rises extremely rapidly as axle weights increase. For example, the heaviest HGV axle does over 150,000 times more damage than a typical car axle. Other aspects of damage, also much higher than cars and vans, are related to gross weight, size or handling characteristics. In the

⁵ Using an on board unit or OBU, for example see *Lorry Road User Charging (LRUC) A way forward for the UK*, MTRU, October 2010

⁶ For example see section 7 and 8 of *Longer and Heavier Vehicles for freight transport*, European Commission Joint Research Centre, July 2009

⁷ Starting with: *Road Track Costs*, Ministry of Transport 1968

⁸ *Allocation of Road Track Costs 1995/96*, Department of Transport 1995

original Road Track document, environmental impacts such as noise and air pollution, were not assessed in terms of money values, although they were acknowledged.

Since that time there has been considerable activity in terms of trying to put specific costs on environmental impacts such as noise, air pollution, and greenhouse gas emissions, and in measuring impacts on health and safety. The DfT has built on the work undertaken for Road Track Costs to develop a rationale for central Government grants to freight transport modes (rail and water) which is designed to remove the largest HGVs from the road network and thus save accidents and other costs (or reduce any damage which is not being repaired).

Originally the amount which could be paid was related to the lorry miles which would be reduced – hence the name “Sensitive Lorry Miles” (SLM) values. In 2010 this was replaced, after a consultative process⁹, by an approach entitled “Mode Shift Benefit” (MSB) values¹⁰. This report considers these in more detail in later sections.

There has thus been a continuing interest in developing the idea of what HGV costs really are, and, combined with this, to what extent the tax income from HGV use would cover these costs. There are two basic ideas as to how this should be approached.

The first is **marginal external cost**, which includes additional congestion and road maintenance as costs, but assumes the road network has been built and does not include an allowance for this. This approach seeks to match the marginal cost per mile of the external impacts of road freight to the perceived cost per mile of using a particular HGV. Obviously, the impacts of a 44 tonne articulated vehicle are much greater than a 7.5 tonne rigid HGV.

The second is the **fully allocated cost** model, which similarly identifies costs according to HGV characteristics, but includes the capital cost of the road network. This can be either as a notional depreciation and/or cost of capital, or on the basis of the typical annual spend on road construction.

In the fully allocated cost model case, congestion is often left out of the cost side since it is borne by road users as a group. However it should be noted that strictly speaking a significant amount of the congestion costs are borne by cars and are not part of the road freight user group.

Finally it must be noted that internalising either capital or congestion costs will result in a more efficient use of vehicles and a better distribution of sizes within the fleet. Low utilisation of vehicle capacity (both from empty running and part loads) is a persistent UK problem.

Thus the report explores the different approaches which can be used, to work out whether HGVs “pay their way”. It illustrates how the answer differs significantly according to what assumptions are made. It reviews the state of play in relation to the issue and what might be done in future.

As a starting point, this report reviews the values used for the marginal cost approach in the light of recent studies, bearing in mind the omissions and limitations and issues such as the mandatory targets included in the Climate Change Bill for reducing greenhouse gas emissions. It goes on to assess the scale of undercharging using different assumptions.

The main conclusions of the report are set out below.

⁹ Review of SLM values: Phase 1 report, DfT 2008

¹⁰ See Mode Shift Benefit Technical Report, DfT 2009

Conclusions

This report has ten main conclusions.

- 1) The largest HGVs, including all articulated vehicles and the heaviest rigid, impose high external costs which, even using the DfT 2006 Mode Shift Benefit (MSB) estimates, are not recovered by a very considerable margin. This leads to poor economic efficiency and misallocation of scarce resources.*
- 2) A minimum estimate is that less than 40% of these costs are being charged at present – an underpayment of about £5billion a year which should be charged to the heaviest HGVs, although this income would be moderated by the reduced HGV traffic that would result.*
- 3) Some of the current values have simply become out of date (e.g. carbon, accident, pcu values) and need to be refreshed, others such as air pollution need to be reviewed.*
- 4) Some new values need to be added to the current DfT marginal cost calculations including:*
 - Long run marginal infrastructure costs*
 - Underspend on maintaining the local road network*
 - Non-monetised environmental impacts*
 - Wider health impacts.*
- 5) In particular the road space value (passenger car unit – pcu) for heavy articulated vehicles is out of date at only 2.9 times the value for cars in conditions where congestion can occur. Even on motorways this should be at least 4, and much higher on local roads.*
- 6) Improved account of marginal environmental costs needs to be taken, recent research on environmental capital and landscape values for infrastructure schemes should be reviewed as part of this process.*
- 7) The changes required would raise the level of unpaid marginal costs which should be charged to ensure economic efficiency. This increase would be more than 50% over the MSB level, depending on which costs and revenues are included and revised.*
- 8) A comparison with full cost allocation does not change this conclusion – while congestion costs would be reduced, since some are internalised within road goods transport, road construction costs would have to be added.*
- 9) In the case of the full cost allocation model, a contribution to general tax revenue would be expected, reducing the notional offsetting income from HGVs in the MSB.*
- 10) The long term results of such an approach would not simply act to reduce external costs, including accidents, environmental damage and climate change. They would encourage more efficiency in the road freight sector by providing a direct stimulus to improving utilisation (load factors).*

It is clear that there are areas of work needed to refine the way environmental costs are treated, and refresh the existing elements which have an established rationale behind their monetisation. This should not detract from the serious failure to charge the heaviest HGVs their proper costs and the need for action to remedy this. In this sense the adoption of the vignette for the UK instead of the systems now common across the EU represents a missed opportunity.”