

Economic Impact Assessment of the proposed banning of heavy duty vehicles in urban areas during certain times (proposed regulation 318A)

Independent Research Study conducted by Dr Roelof Botha, Adjunct Faculty Member, Gordon Institute of Business Science - GIBS (University of Pretoria) - September 2015

Background

The focus of this study falls on an economic impact assessment (EIA) pertaining to a proposed new regulation (318A) by the Department of Transport (DoT), which seeks to prohibit goods vehicles, the gross vehicle mass of which exceeds 9000 kg, from operating in urban areas between the hours of 6:00 to 9:00 and 17:00 to 20:00 from Monday to Friday.

Over the past decade, the author has been privileged to be involved in a number of authoritative research reports that have dealt with the role that logistics infrastructure fulfils in the Southern African economy, including a macroeconomic impact assessment of road transport construction in Gauteng (Botha & Lockwood, 2005), an infrastructure gap analysis for Mpumalanga (Botha, 2008), and the design of a regional infrastructure development master plan for the Southern African Development Community - SADC (Botha, 2010).

This study represents a further addition to the knowledge base on the economic impact of the regulatory environment for road infrastructure, especially as it relates to the target group for the proposed regulation 318A.

Concern has been raised by a large variety of business leaders, transport engineers and representative associations in the road freight industry about the proposed limitations on the times that heavy vehicles may be allowed to be on urban roads. A number of well-researched reports have been submitted to the DoT detailing the concerns of operators of heavy vehicles, especially regarding the perceived adverse effect on the efficiency of South Africa's road freight logistics system.

It was deemed necessary by a major manufacturing concern with a large fleet of heavy delivery vehicles to augment these arguments with some form of quantification, in monetary terms, of the likely impact of reg. 318A. The author was subsequently commissioned to conduct an economic impact assessment (EIA) of the proposed regulation, based on a case study. This is particularly useful for EIAs, as it is based on exact quantifiable data, the results of which can then easily be extrapolated to a relevant industry or sector of the economy, based on realistic assumptions. It should be noted at the outset that the analysis contained in this EIA is based on accurate and verifiable data from the financial statements of the case study company.

The hope is expressed that the research results will assist in steering the debate on freight logistics towards the root cause of undue congestion on South Africa's urban road network, namely the fairly dramatic deterioration of Transnet's ability to support the freight industry with sufficient and efficient alternatives to road transport.

Methodology

The methodology used for the EIA was based on input/output (I/O) table analysis, which records economic transactions between the different industries of a country. This makes it possible to quantify the effect on GDP, employment and taxation revenues that flow from a permanent change in aggregate demand. It is realistically assumed that the imposition of reg. 318A will reduce the amount of goods transported via road in at least the short term, after which an increase in the country's heavy vehicle population can be expected (over the medium term), aggravating the general level of road congestion.

The effects of the short-term decline in the demand for a particular supplier's product are divided into a direct, indirect and induced effect, which captures all the linkages in the value added chain of a particular industry (or individual producer), as well as the effect of changes in household consumption expenditure (created as a result of the initial change in demand).

The analysis distinguishes between the *direct* impact of the decreased output on the sector itself, the *indirect* impact on upstream and downstream industries, and the *induced* impact on the broader economy arising from the decline in household incomes. Collectively, these three impacts comprise the total potential result of a change in the output of a particular sector.

It is important to note that I/O analysis can be applied to either increases or decreases in aggregate demand. It was noted in one of the objections to regulation 318A submitted to the DoT that 38% of all travel on urban roads takes place during peak hours (06:00 to 09:00 and 17:00 to 20:00), which would reduce the productivity of heavy goods delivery by more than one-third.

The calculation of loss of productivity by the case study company is in line with this finding, but is marginally more conservative at 32.7%. This constitutes the margin by which permanent demand is assumed to reduce by (short-term) with the application of I/O analysis to the income statement metrics of the case study company.

For the purposes of this study, the EIA measured the decline in GDP, employment and taxation revenues that would logically follow a decline in output (turnover) by the case study company (in a scenario where reg. 318A is in force).

The decline in turnover would result from the fact that fewer deliveries of the company's product would reach depots, wholesalers and retailers.

Lower turnover means lower direct manufacturing and variable costs and the resultant lower expenditure figures of the company were classified in terms of proxy items found in the standard industrial classification (SIC) of national accounts data (for which multipliers are available).

Table 1: Methodology for determining the economic impact of proposed restrictions on heavy vehicle operating times (reg. 318A) – a case study

Step	Methodology
1	A case study was selected of a manufacturing company that operates 701 heavy vehicles for delivery of its products to depots and retailers (including owner/driver vehicles) and its income statement for the company's 2015 financial year was analysed to determine which income & expenditure items would be adversely affected by reg. 318A
2	Expenditure items related to foreign payments (i.e. royalties & centralised procurement agency fees) were omitted. Company taxation and excise duties were also omitted, due to the fact that these expenditures constitute government revenue and the public sector not exhibiting the characteristics related to the price elasticity of demand (inherent in the market mechanism). The rest of the expenditure items were classified according to the standard industrial classification (SIC), in order to facilitate the determination of input/output table analysis.
3	A calculation was obtained of the loss of physical deliveries (and turnover) as a result of the imposition of reg. 318A and this ratio (32.67%) was applied to total turnover, cost of sales and variable cost items related to the generation of turnover.
4	Fixed cost expenditure categories were individually assigned a reduction ratio ranging from zero to 15% (a conservative assumption), depending on the envisaged impact of the decline in turnover. It was assumed that no retrenchments would ensue, so staff costs were not adjusted.
5	<p>Economic output multipliers corresponding to the SIC classification of expenditures (in terms of national accounts input/output tables) were then applied to the loss in revenue and reduction of expenditures that would result from the restricted delivery times. These multiplier effects include direct, indirect and induced effects flowing from the full supply chain of the relevant manufacturer. The results were classified in terms of the following:</p> <ul style="list-style-type: none"> • Decline in total output in the economy (GDP) • Decline in formal employment • Decline in informal employment • Decline in taxation revenues flowing to SARS (fiscal impact) <p>The taxation effect was also calculated separately for the three key categories of fiscal revenue, namely individual income tax (flowing from a decline in employment in linked industries), company tax and indirect taxes (on products).</p>
6	The direct fiscal impact was also calculated separately to indicate the loss of taxation revenue that would ensue from lower excise duties, as well as the company tax liability, due to the company's profitability being lowered as a result of the proposed regulation

Table 2: Methodology for determining the economic impact of proposed restrictions on heavy vehicle operating times (reg. 318A) – extrapolation of the case study results to the road freight industry

Step	Methodology
1	The ratio between value added by the transport sub-sector and the sector for transport, storage & communication was determined by reference to national accounts data
2	The ratio between value added by road transport and total transport was determined by reference to national accounts data
3	The final ratio thus obtained (60.57%) was then applied to the total value added by the sector for transport, storage & communication in 2014, as per national accounts data
4	Two scenarios were then applied to calculate the economic impact resulting from a decline in road transport activity (due to the proposed regulation). The first one assumed a decline of 10% and the second one a decline of 20%.
5	<p>The effects of these declines were regarded as the potential loss in demand in the economy and were subsequently analysed via input/output table analysis, which provided the total downstream effects related to the following indicators:</p> <ul style="list-style-type: none"> • Total output (GDP) • Formal employment • Informal employment • Taxation revenues <p>As was the case with the case study, the taxation effect was also calculated separately for the three key categories of fiscal revenue, namely individual income tax (flowing from a decline in employment in linked industries), company tax and indirect taxes (on products).</p>
6	The results of the macroeconomic impact relating to the whole road freight transport sector were summarised in two tables (for each of the two scenarios), indicating a significant negative effect on all of the key indicators covered by step no 5.

Data sets

The following data sets were utilised for the purposes of the study:

- Detailed income and expenditure accounts of the case study company
- South African national accounts (various calendar years)
- *Quantec Data* multipliers

Conclusions

The EIA revealed that the imposition of reg. 318A would exert a severely negative effect on the business activities of case study company as well as the economy as a whole, as summarised in the accompanying tables (3 to 5).

It should be emphasised that the results obtained in table 3 can be verified by the data in the income statement of the case study company and the national accounts of South Africa.

Table 3: Summary of results of the economic impact assessment of reg. 318A (the case study company)

	Number	R million
Decline in total demand in the economy		3 657
Decline in GDP via value added in all sectors		11 294
Loss of formal sector jobs (private sector)	19 333	
Loss of informal sector jobs (private sector)	4 816	
Decline in personal income & wealth taxes		411
Decline in corporate tax		312
Decline in VAT & other indirect taxes		579

In addition to the above data, it should be pointed out that a 32.7% estimated loss of deliveries (and hence turnover) will translate into the following loss of taxation revenues (short-term) payable by the case study company:

- Excise duties: R3.3 billion
- Company tax: R1.5 billion

Two scenarios were identified for purposes of extrapolating the trends determined by the case study company data to an economy-wide effect, namely where demand for road freight logistics services declines by 10% and 20%, respectively.

Table 4: Summary of results of the economic impact assessment of reg. 318A (extrapolated to all heavy duty vehicles) Scenario 1

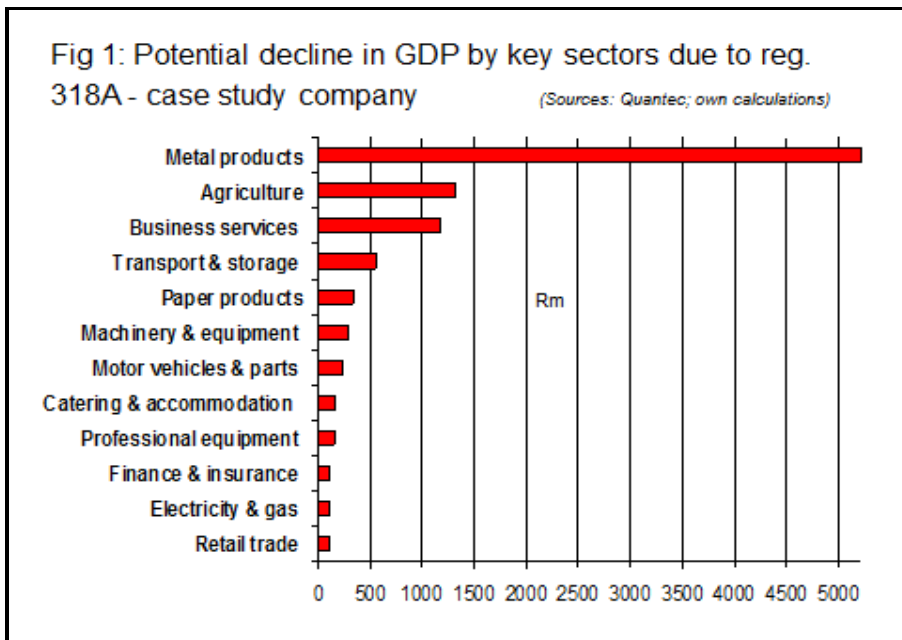
	Number	R million
Decline in total demand in the economy		20 588
Decline in GDP via value added in all sectors		62 819
Loss of formal sector jobs (private sector)	105 477	
Loss of informal sector jobs (private sector)	26 100	
Decline in personal income & wealth taxes		2 347
Decline in corporate tax		1 965
Decline in VAT & other indirect taxes		3 716

It was pointed out in the industry's objection to the proposed regulation that this decline could potentially be in the order of one-third, which is aligned to the data for the case study company. The declines utilised in the two scenarios can therefore be regarded as conservative.

Table 5: Summary of results of the economic impact assessment of reg. 318A (extrapolated to all heavy duty vehicles) Scenario 2

	Number	R million
Decline in total demand in the economy		41 176
Decline in GDP via value added in all sectors		125 638
Loss of formal sector jobs (private sector)	210 955	
Loss of informal sector jobs (private sector)	52 200	
Decline in personal income & wealth taxes		4 693
Decline in corporate tax		3 931
Decline in VAT & other indirect taxes		7 431

The most affected sectors by loss of value (in terms of the SIC classification) are depicted by figure 1.



It should be noted that the case study company operates merely 0.2% of the vehicles in the relevant load class, a further indication of the conservative nature of the above extrapolations.

Scenario 2 indicates that the implementation of reg. 318A could lead to the destruction of more than 210,000 formal sector jobs, a decline in the country's GDP of R210 billion and lower taxation revenues to the value of more than R16 billion - clearly a situation that would threaten fiscal stability in an environment of low economic growth.

It is very clear that the proposed regulation 318A will have severe unintended negative consequences for the economy as a whole, and for SA Revenue Services and the case study company (& many other firms), in particular.

It is therefore recommended that the proposed restrictions on heavy goods vehicles, as contained in regulation 318A be withdrawn.

A note on the adverse impact on corporate tax

One of the most important findings from the case study research relates to the issue of company profitability, which would ultimately create significant problems for the revenue budget of National Treasury.

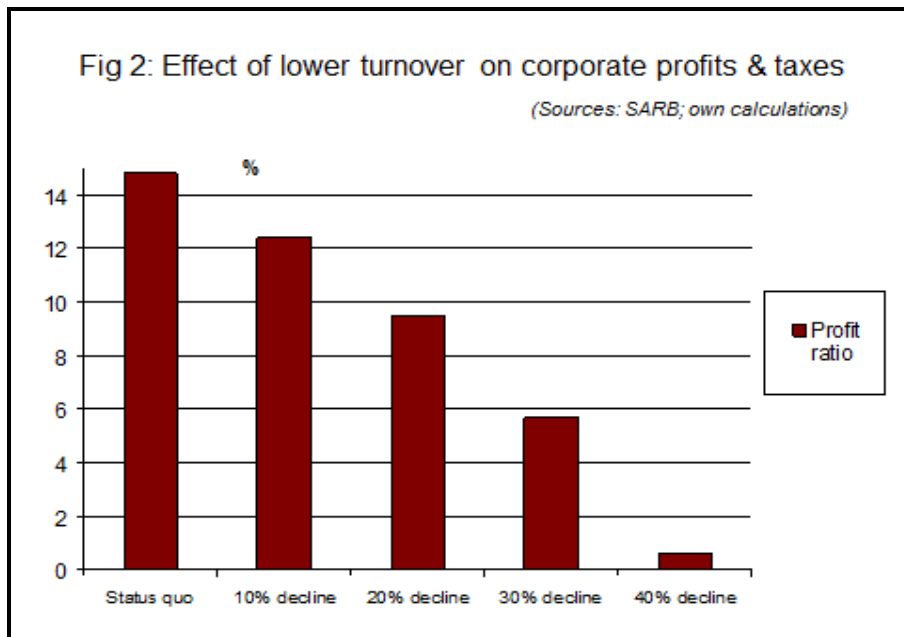
The moot point of the relevant analysis relates to the fact that fixed costs decline by a significantly smaller ratio as variable costs (or not at all) when a company's turnover is lowered (as a direct short-term result of reg. 318A). The case study revealed that corporate tax declines by 60% in a post-regulation scenario (short-term), whilst turnover itself declines by much less, namely 32.7%. This result is illustrated by a tax reconciliation pertaining to the current situation and one which takes account of the negative effects of the proposed regulation (index-based - table 7).

Table 6: Index-based tax reconciliation of case study company before and after proposed reg. 318A

	Before	After
Total revenue	100.00	67.33
Less: Excise duties paid	26.58	17.89
Gross revenue	73.42	49.44
Less: Cost of sales	19.48	13.12
Gross manufacturing profit	53.94	36.32
Less: Other variable costs	5.63	4.79
Gross profit	48.31	31.53
Less: Marketing costs	5.86	4.98
Profit before fixed costs	42.45	26.55
Less: Staff costs	8.97	8.97
Less: Maintenance	1.59	1.35
Less: Administration expenses	4.12	3.50
Less: Depreciation	2.27	1.93
Less: Other expenses	1.34	1.14
Profit before tax	24.16	9.65
Current tax	6.39	2.55
Net profit	17.77	7.10

The exponential rate at which corporate tax revenues decline in the event of lower turnover is aptly illustrated by figure 2, which is based on a hypothetical company that reflects a similar profit/turnover ratio as for the whole economy (national accounts data).

The analysis shows the amplified negative effect on profitability (and hence corporate taxation revenues) of declines in turnover of 10%, 20%, 30% and 40% (Assuming that a ratio of 75/25 exists between variable & fixed costs).



Furthermore, this obvious threat to the sustainability of corporate taxation revenue flows to National Treasury from companies that rely heavily on road freight logistics will be exacerbated in the medium term (due to the effect of reg. 318A), as extensions to existing fleets entail numerous fixed costs.

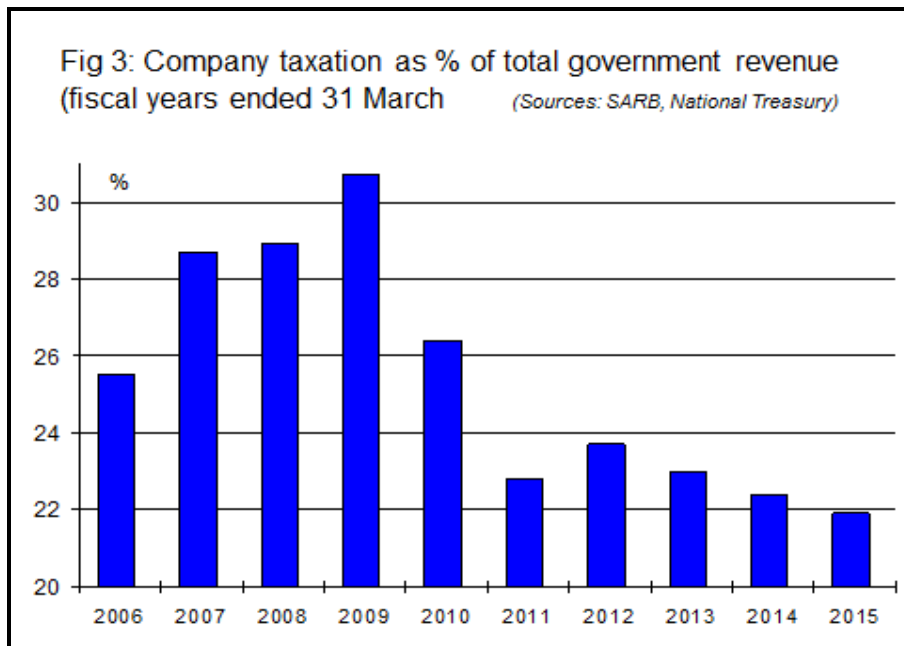
Against the backdrop of the declining GDP growth trajectory of the South African economy, the potentially severe negative effect of the proposed new regulations cannot be over-emphasised.

Real output growth was negative in the second quarter of 2015 and if the third quarter were to follow suit, the country will officially be in recession.

Turning to the problems being faced with revenue collection at National Treasury, figure 3 confirms the fact that corporate taxation's contribution to total government revenue is at its lowest level in a decade, mainly as a result of the after-effects of the 2008/09 recession and economic lethargy in general.

Any further decline in the contribution of corporate taxation to total government revenue would force National Treasury's hand in an unavoidable increase in personal income tax rates and the value added tax rate.

Such a move will not be popular amongst the majority of the electorate and has the potential to exacerbate the already high level of occurrence of socio-political unrest in many parts of the country.



Note: *The case study was confined to the impact on value added in the private sector (via I/O table analysis) and did not attempt to quantify the impact on the economy resulting from lower levels of expenditure related to government services. The reason is that public goods defy the causalities inherent in microeconomic analysis of private goods & services. A public good is defined as a commodity that is non-rival in consumption, i.e. consumption by one person does not prevent anyone else from doing so as well.*

When a good is non-rival in consumption, it means that once it has been provided, the additional cost (in terms of resources) of consumption is zero or negligible. Consumers are therefore tempted to hide their true preferences for public goods, and the market mechanism is not designed to allocate sufficient resources towards such goods.