# 8 ECONOMY

## 8.1 INTRODUCTION

This chapter addresses the theme of economic impacts for cities considering or planning the implementation of a road pricing scheme.

Economy, for the purposes of this chapter and the CURACAO project, will focus on the local economy and its primary function i.e. the commercial operation of businesses in towns and cities. Much of this relies, in transport related terms, on good access to services for employers, employees and customers alike. It is the confidence in this operational function being maintained, let alone improved, that would appear to be the major barrier for most businesses endorsing road pricing.

The chapter will consider and focus most of its attention on what is known about the impact of road pricing on the local economy and how evidence has been collected over time.

It should be noted that the theme of economy has not been considered in previous work in this study to be a fundamental objective when implementing road pricing schemes. It is however one of a number of emerging objectives as part of a package of measures that is considered when introducing road pricing schemes.

In what follows, we will first of all consider the importance of the theme. We then go on to briefly outline what is known about the theme, introducing the primary concepts of accessibility, confidence, agglomeration and the perceived impact on the freight sector. This is followed by a review of the evidence base on road pricing, categorising the sources of information. We then briefly assess the policy implications of road pricing, before outlining the implications of the theme of economy in relation to other themes in CURACAO. We conclude by outlining the research gaps of significance to CURACAO and road pricing in general.

## 8.2 WHAT IS THE IMPORTANCE OF THE THEME?

Road pricing will change the costs of travel by car and by competing modes. It will also change the cost of commercial vehicle operation. Behavioural responses to these changes will also affect the environment in and around the charged area. All of these changes can be expected to influence the costs of doing business in the charged area, and the turnover of customer-focused businesses. They may also change property prices and residential location choices. The scale and direction of these impacts are difficult to estimate, and will be further affected by perceptions of the impact of pricing, any complementary policy initiatives, the resulting image of the charged area, and its relationship with competing centres.

These uncertain economic impacts are frequently cited as one of the main reasons for cities' reluctance to introduce road pricing. This is reflected in the results of the User Needs Assessment Questionnaire, in which our 21 city users ranked this topic second out of nine in terms of importance to them.

## 8.3 WHAT IS KNOWN ABOUT THE THEME?

### 8.3.1 Access to goods and services

The health of the local economy is a vital element of everyday business in towns and cities. An important component of wellbeing in local economic terms is good access to business and services and the movement of goods and people.

Congestion and the negative connotations associated with it are viewed as an additional cost to business. This impact on the local economy is a key driver in seeking measures to ameliorate the situation, maintaining traffic flow and good access.

Policy makers are charged with seeking a balance in order to keep traffic moving and 'ease' congestion on the road network to encourage economic development and prosperity through measures including road pricing.

### 8.3.2 Confidence

The continuing prosperity of any local economy is subject to externalities such as national and global economic forces. The issue of confidence that can influence change in such markets is borne out in the fluctuating nature of economic markets.

Confidence is also a key issue in road pricing. It is important for policy makers and politicians in particular to clearly identify the barriers that exist to road pricing before agreeing to implement a scheme. Evidently there will be barriers to overcome in this regard.

In the past the lack of confidence in road pricing has been the root cause of many schemes not progressing towards implementation. A major problem in this regard has been that the economic and relocation impacts of transport schemes are notoriously difficult to measure or predict. For road pricing, limited empirical evidence has made the problem worse. There is no simple answer to the question: how will road pricing affect the local economy?

### 8.3.3 Some concerns about road pricing – confidence in the business sector

Work by Whitehead (2002, 2005) suggests that there is the potential for RUC to damage city centres, both by deterring shoppers and visitors and by increasing costs to businesses. He maintains that business is sceptical regarding the length of time it may take for positive benefits to filter through, for example the period of time taken for fewer car journeys to be replaced by more journeys by public transport etc. The time-lag between the introduction of the scheme and the realisation of the improved conditions (notable travel time saving and reduced impact on the environment) is a major concern for the retail sector. This in itself will influence levels of confidence in road pricing.

Whitehead also explains that whilst businesses may accept public transport improvements as a principal strand of charging revenue usage, there is concern over perceived complementary measures to induce greater numbers of people to city centres, including improvements to the streetscape and surrounding and quality of the centre or charged area itself.

Inevitably further work is required in this regard, liaising with business and in particular the retail sector to build confidence in road pricing.

### 8.3.4 Agglomeration

The interaction between firms and individuals in close environments allows the sharing of knowledge and the development of new ideas. The clustering of activity in one area is known as agglomeration. Whilst transport cannot generate clusters, it can play an important role in facilitating their expansion by reducing travel time and costs, bringing firms, workers and consumers closer than would otherwise be the case.

Transport improvements that deliver time, cost and journey time reliability savings, particularly for businesses and freight traffic, can significantly contribute to GDP through an increase in cost savings for businesses.

*The Eddington report*

The Eddington report (Eddington, 2006) attempted to consider the role that transport could contribute to productivity benefits within agglomerations. The report discovered that not all firms within an area are equally agglomerated and therefore the improvements experienced as a result of a transport improvement will not be uniform. The contribution to the improvement made will depend upon the characteristics of the industry.

Eddington reported that the service sector will always tend to cluster in an urban area; hence service sectors that agglomerate typically do so because of urbanisation economies. Services are located where good quality and large labour are in good supply, which helps to balance out the high costs of such locations.

More generally, Eddington considered that the relation between agglomeration and transport is a relatively new and untested one.

*Attempts to quantify agglomeration*

Attempting to quantify the impact of transport policy on the wider economy has led to some Spatial Computational General Equilibrium (SCGE) modelling work by Laird *et al* (2005). They suggest that transportation affects the economy via the labour market, the goods market and the agglomeration economies. In particular, road user charging can influence the labour market by discouraging labour force participation through a decrease in the household wage (Parry and Bento, 2001).

Laird *et al* argue that if network effects that appear in the wider economy (e.g. changes in output and employment) are considered a crucial argument in infrastructure decisions, careful economic analysis of their strength and significance on a case by case basis should be made.

The challenge here is how to quantify this in real situations.

### 8.3.5 Impact on Freight

There will always be implications for the freight industry as a result of any road pricing scheme. Considerations for the freight sector are, however, an often neglected topic in the bigger picture of the impact of congestion charging.

One study considered changes in freight operators' behaviour as a result of the introduction of a time of day pricing initiative by the Port Authority of New York and New Jersey[6]. The authors claim that their study is the first comprehensive study on freight response to peak load/toll pricing (Holguin-Veras *et al*, 2006).

Through a survey of businesses, the authors found that freight users would be likely to employ one or a combination of the following three methods:

- Increase their productivity to offset the increased transportation costs;
- Change to use untolled facilities; and
- Pass the costs on to consumers.

Holguin-Veras *et al* also speculated that the ability to pass on the costs depended on the nature of the "balance of power" between the carrier (i.e. freight operator) and the receiver. When the balance of power was in the receiver's favour, it was considered that the freight operator would have no choice but to increase their productivity to offset the charges.

[6] Despite its name, the Port Authority of New York and New Jersey manages bridges, tunnels, airports and transit in New York City and Northern New Jersey. Variable time of day pricing is implemented on its network of bridges and tunnels (George Washington Bridge, Lincoln Tunnel, Holland Tunnel, Goethals Bridge, Outerbridge Crossing, Bayonne Bridge). Ref.: http://www.panynj.gov/CommutingTravel

Eddington pointed out in his work the importance of journey time reliability and the impact that increasing congestion has on delays to freight deliveries, particularly where perishable goods are concerned, impacting heavily on supply chains and on low-inventory just-in-time production systems.

Furthermore, a survey by the Confederation of British Industry (CBI) showed that 84% of new economy firms would be very badly affected if next day delivery services from the UK were no longer available. Freight movement would be better managed through improved reliability, which would give way to reduced inventory and improved optimisation of vehicle use.

The Auckland Road Pricing Evaluation Strategy (ARPES) (MOTNZ,2006) created the hypothesis of charging Commercial Vehicles at the same rate as cars (non commercial users), on the basis that higher charges could harm business.

These findings would have important implications for a truly integrated transportation policy that takes into account not only the movement of people but also the movement of goods and hence considers developments in the logistics industry. As Holguin-Veras et al argue, “the objective of moving traffic from peak to the off-peak hours necessitates a comprehensive approach that targets various links in the supply chain”.

## 8.4 SOURCES OF INFORMATION

The need for a substantive base of evidence fuels the lack of confidence in road pricing.

Research has been carried out to measure the potential economic impact of road pricing strategies. The general view is that the size of this impact is quite small but there is a need for more empirical research to study actual schemes after they have operated for a number of years.

The general consensus is that road pricing has had little adverse economic impact where it has been applied, for example in locations such as Singapore, where a road pricing scheme has been in existence for over 30 years. However, as recorded in evidence relating to Singapore (Holland and Watson, 1978; Armstrong-Wright, 1986), it is often difficult to extrapolate the direct (economic) impact of introducing a road pricing scheme from what would have happened anyway and what was caused by other factors.

In the following we present under 3 key headings examples of research, case studies which demonstrate and provide evidence relating to the economic impacts of road pricing.

### 8.4.1 Predictive Studies

*London – congestion charging*

Model-based predictions typically suggest small impacts. An analysis of the impacts of congestion charging in London was carried out using the MEPLAN model of London and the South East, which reflects the effects of changes in accessibility on location (May *et al*, 1996). For a £4 charge to enter central London, the predictions were:

- Central London employment would rise by 1.0%;
- Inner and outer London employment would fall by around 0.5%;
- Household numbers would fall by 0.2% in central London and 0.1% in outer London;
- Household numbers would rise slightly in inner London; and
- Higher income household numbers would increase in central London.

*Edinburgh's Proposed Scheme*

A study in Edinburgh, using the START/DELTA model, which includes responses to both accessibility and environment (Bristow *et al*., 1998), indicated that a £1.50 charge to enter or leave the city centre would increase city centre population by 2.2%. An earlier study with a similar model, but with different parameters, (Still *et al*., 1998) had suggested a 1.8% reduction in city centre population, and a 3.1% reduction in city centre employment. Both studies suggested that the impacts of changes in accessibility were larger than, but opposite in sign to those of changes in environmental quality.

**Stockholm**

At a more generic level, in simulation studies, Eliasson and Lundberg (2002) estimated that congestion pricing would result in the redistribution of two percent of households and a slightly higher redistribution for businesses in a typical European city.

### 8.4.2 Attitudinal Research

*Singapore*

The early study of Area Licensing in Singapore (Holland and Watson, 1978) did not attempt to assess the impacts on land use. It did ask business people for their assessment of the scheme, which was largely positive, but this may well have reflected a general view in Singapore at the time that government was making the right decisions.

*UK - Cambridge, Norwich and York*

A traffic demand management study concentrating on businesses in three historical cities in the UK[7] investigated what was expected to be the impacts of a hypothetical road pricing scheme which would charge £3 per day to enter the city centre in the morning peak (Gerrard, 2000).

The majority of respondents anticipated positive impacts on the environment and congestion, but negative effects on the economy and tourism, and on their own staffing and profitability. When asked whether road pricing would influence their next location decision, 53% said it would, and 26% that it might.

### 8.4.3 Empirical Evidence

*Singapore*

When ALS was introduced in Singapore, there was considerable speculation that the restrictions would accelerate the trend towards decentralisation from the city. In practice this did not happen because Singapore is too compact in size for companies to decentralise. Furthermore, it was found that the mobility of labour did not appear to diminish with pricing, as public transport usage was high anyway, and pricing appeared to improve public transport services due to reduced congestion. (Holland and Watson, 1978)

In analysing the economic implications of Singapore's Area Licence Scheme Holland and Watson (1978) did not report on the economic impacts during its implementation. They did however note that the number of goods vehicles entering the CBD during the charging period had increased. The argument is that operators were rescheduling trips to take into account reduced congestion.

This supports the argument that there is a positive impact on the economy due to time saved to businesses. However it is also borne in mind that the implementation of the pricing

[7] Cambridge, Norwich and York.

scheme coincided with the period of the oil shocks (1970s) and hence it might not have been possible to discern the two impacts on the economy.

Ten years later another attempt was made to assess the impacts retrospectively. It was concluded that there was no evidence of adverse impacts on economic activity in the city centre (Armstrong-Wright, 1986). However, this assessment was made difficult, both because parking restrictions had been introduced at the same time, about which businesses were much more critical, and because the Singapore economy had expanded rapidly in the intervening period, masking any impact of road pricing.

*Norwegian Toll Rings*

Evaluation work completed in Trondheim by the Chamber of Commerce between 1991 and 1992 indicated that there was some evidence of businesses located within the toll ring having lost trade during the early part of 1992. However from the summer period of 1992, no significant negative impact on business trade could be read from the figures and hence the Chamber of Commerce concluded that there was no significant effect of the toll ring on trade at all.

Tretvik (1999) reports an analysis of the impacts on turnover within, and outside the Trondheim toll ring. Before implementation, a shopping survey concluded that 25% of shoppers were likely to change the location or timing of their shopping activity in response to the toll ring. A second survey in 1992, a year after implementation, recorded that 10% had in fact changed destination or timing of their shopping trips. However, the impact on retail turnover did not reflect this downturn in activity. In 1992 the Chamber of Commerce concluded that there had been hardly any effect on trade as a result of the toll ring. Longer term time series data from 1987 to 1997 on Trondheim's share of county retail sales and on annual turnover in different parts of Trondheim showed that Trondheim as a whole, and the CBD in particular, had been losing market share between 1987 and 1990, but that the city's market share within the county grew in most years from 1991 to 1997, and that the toll ring's share was maintained throughout that period. While turnover will be affected by a wide range of factors, there is thus no evidence to suggest that the toll ring adversely affected trade within the ring.

The toll rings were designed to pay for new road infrastructure and for the charge to be withdrawn once the infrastructure was fully paid for. Norway's experience suggests that there has been no significant impact on retail trade for businesses located within the charged area. It also demonstrates that the predicted behaviour of economic agents both before and after scheme implementation differed considerably, hence the net loss to trade and the wider economy of Trondheim was minimal.

*London Congestion Charging*

In London, work looking at monitoring the impacts of congestion charging has been completed by Transport for London, which made the following conclusions:

- The introduction of charging in February 2003 coincided with a temporary economic slowdown, as well as a wider set of local, national and international conditions that were not favourable to general economic performance.
- Analysis of several different indicators of economic performance, including measures of business population and turnover, did not reveal evidence of a significant congestion charging impact.
- Shops within the inner core of the charging zone found that their rental values increased.
- TfL's business surveys conducted in 2004 showed a continued recognition of the transport benefits associated with congestion charging.

Other work conducted during 2005 found that trends in business registrations for VAT remained strong and that within the charging zone, the retail sector has increased its share of enterprises and employment since 2003.

A majority of businesses in the congestion charging zone recognised that 'decongestion' has created a more pleasant working environment and easier journeys for employees using public transport for work. Ernst and Young were commissioned to undertake an independent review of the monitoring of the business impacts. Their work concluded that the (then) £5 charge has had a broadly neutral impact of the central London economy. However, as charging had only been in place for 2½ years (the date of the review), this had made it difficult to draw definitive conclusions on the long term impact.

The Mayor's original business case for the scheme suggested that congestion costs the London economy around £2 - £4 million per week in lost time. This is coupled with TfL prediction that the range of public transport services available is saving Londoners in the region of £3.5 million per week.

TfL's view that 'concerns over the detrimental impact of charging on economic activity appear to be misplaced' is not shared by all business organisations. London Chamber of Commerce and Industry's two surveys found that 85% of the retailers who took part considered the charge had 'failed to improve their productivity'. John Lewis conducted some of their own research and concluded that the effects of charging had led to an estimated sales reduction of 7.3% at their Oxford Street store.

Quddus *et al* also undertook research to assess the impact of the London congestion charge on retail sales. The modelling work showed the association of sales from the John Lewis store on Oxford Street with the congestion charge the (then) closure of the Central Line, the state of the economy, the consumer price index, the number of overseas visitors to London, trend and seasonality.

Using this model, the congestion charge was considered to have a negative impact on the weekly sales of John Lewis Oxford Street. Other variables such as the effect of the closure of the Central Line and the effect of increased bus frequency during the morning peak were tested, which were found to have a negative and positive impact on John Lewis sales, respectively.

Work undertaken by Ernst and Young suggests that TfL's work and conclusions are broadly in line with their own but that further quantification of all the benefits and costs arising from the scheme should be conducted to check that the charge delivers an overall economic benefit even when all costs have been taken into account.

Whilst there is a degree of support amongst the business community for congestion charging (London First, 2006), it is also believed that many smaller businesses may have experienced a drop in custom which could have a likely impact on reducing future investment decisions.

## 8.5 POLICY IMPLICATIONS

It remains a challenge to make conclusive and extensive comments with regard to the policy implications of the economic impacts of road pricing.

We have already alluded to the fact in Section 8.3.2 that much depends on confidence in this regard, which in turn requires an evidence base to inform progress. In short, without evidence most policy makers will not wish to risk the implementation of a relatively unknown measure or scheme.

For example, the UK Government has stated that the economic impact of road user charging proposals should be understood prior to their implementation and that it would not be appropriate to approve schemes without a carefully considered approach based on sound research. However, it is difficult to demonstrate the economic impact of road pricing without further examples of actual 'live' schemes. This creates a relative impasse.

But there are examples where road pricing could be considered to be a 'success'. For example, in London It would seem reasonable to conclude from the evidence available that congestion charging has largely been a success. The impact on business turnover has been minimal, with the wider impact on the economy being positive, particularly in terms of travel time savings and the additional provision of public transport services available as a result of congestion charging revenue being re-allocated back into public transport improvements.

There appears to be a mismatch between the perception that road pricing will lead to substantial out-migration of residents and business, and the generally low level of impact as measured.

However, this may be explained by the characteristics of those few cities which have as yet implemented road pricing, which are typically dominant centres in their regions, and subject to only limited economic competition. It may well be that smaller centres with closer competing centres would experience greater impacts.

In due course it may be possible to assess this further through additional empirical research. In the meantime research will have to rely on the results of predictive studies and broader analysis of the urban economy.

## 8.6 WHAT IMPLICATIONS DOES THIS THEME HAVE ON OTHER THEMES IN THE SOAR?

In what follows we summarise under key headings the implications for road pricing in relation to other themes in CURACAO:

- **Objectives**: Support for the urban economy should be considered either as an objective of, or a constraint on, road pricing schemes.
- **Scheme design**: It seems probable that schemes can be designed which have a lower adverse impact on the urban economy, or are more supportive of it. Further work is needed to identify the critical design elements.
- **Technology and Business Systems** : It is not clear that there is a link between technology or Business Systems and the urban economy.
- **Prediction and Appraisal**: The availability of models which reflect the impact of accessibility and environmental quality on location choice and economic activity is fundamental to an improved understanding of this theme. In the present state of the art, prediction of the wider economic impacts of road pricing is one of the most problematic and least well developed areas of research. In economic theory, road pricing is considered to improve efficiency in the travel market leading to benefits throughout the economy. In practical policy-making, concerns exist about whether real road pricing schemes will lead to positive or negative benefits for economic activity within charged areas and whether unilaterally implemented schemes may affect economic competition between localities.
- **Environment:** Road pricing can improve the urban environment which in turn may potentially contribute to improving the urban economy.
- **Equity**: Economic impacts can have substantial secondary impacts on equity. Poorer households are more likely to have to move if residential areas become more attractive, and are more vulnerable if they become less attractive. Those without good public transport access are more vulnerable if shops and facilities shut down or leave an area. The clustering of particular industries in one area could have an impact upon equity in terms of the re-location of particular types of workers. For example, the re-location of city professionals to one new hub of economic activity may have equity implications for those living outside the agglomeration
- **Acceptability**: Most acceptability research focuses on the public rather than businesses, though economic impacts can be expected to have a significant impact on business acceptability. Lack of public acceptability may well have an adverse

impact on the urban economy and on residential choice. Agglomeration has benefits in terms of concentrating economic agents together in clusters hence reducing travel time and cost – therefore the opinion of such a mass market may impact positively upon acceptability.

- **Transferability**: It seems likely that there will be marked differences in economic impact between cities, not only within the same country but across different nation states. For example, established schemes such as those of Singapore or Norway would have been unsuitable to use as benchmarks or comparators to the London scheme – the political set up and physical geography of both these places is much different from London.

## 8.7 FURTHER RESEARCH

Whilst it is recognised that there is a "compelling link between the transport system and economic prosperity, with new transport connections enabling new economic relationships to be forged" (Eddington, 2006), little is known about the relationship between productivity and transport policy. This is an area of interest in which more research is required.

In addition, economic theory postulates that users who place a higher value on time, such as the freight industry, should benefit from road pricing. However this argument is based primarily on theory with limited practical evidence. There is little knowledge regarding the impact of congestion charging on logistics systems (e.g. just-in-time inventory systems) and this is a topic that needs a considerable amount of further research.