HARVARD UNIVERSITY
JOHN F. KENNEDY SCHOOL OF GOVERNMENT

Taxes and Charges to Manage Oil Demand in Australia:

Policy Recommendations for the Australian Federal Government

Jules Flynn*

*Jules Flynn, Master in Public Policy, John F. Kennedy School of Government
Harvard University 2006

This document appears as discussion paper 2006-02 of the Belfer Center for Science and International Affairs (BCSIA) and as contribution 2006-02 of the center's Environment and Natural Resources Program (ENRP). Comments are welcome and may be directed to Henry Lee at the Kennedy School of Government.

This paper may be cited as Flynn, Jules, "Taxes and Charges to Manage Oil Demand in Australia: Policy Recommendations for the Australian Federal Government." ENRP Discussion Paper 2006-02, Belfer Center for Science and International Affairs, John F. Kennedy School of Government, Cambridge, MA, June 2006.

The views expressed within this paper are the author's and do not necessarily reflect those of the Environment and Natural Resources Program, the Belfer Center for Science and International Affairs, or Harvard University. Reproduction of this paper is not permitted without permission of the Environment and Natural Resources Program. To order copies of the paper or to request permission for reproduction, contact: ENRP, John F. Kennedy School of Government, Harvard University, 79 JFK Street, Cambridge, MA 02138 (617-495-1390).

FOREWORD

This paper was originally written for an Energy Systems course at Harvard University's John F. Kennedy School of Government. The quality of the research and the argument made by the author were so impressive that we felt that it merited publication and distribution to a wider audience of policy-makers.

As Australia grapples with volatile oil prices and the looming threat of climate change, the country is searching for new directions. Jules Flynn analyzes how Australia could reduce demand for gasoline and diesel fuel through tax policy.

The publication of this paper was made possible through the generous support of the Roy Family Fund.

Henry Lee

Jaidah Family Director
Environment and Natural Resources Program
John F. Kennedy School of Government

SUMMARY

This paper assesses the options available to the Australian federal government to reduce demand for gasoline and diesel through taxation and charges.

The paper begins by highlighting the need for gasoline and diesel demand management (despite relatively slowly growing consumption) as a result of the economic impact of price volatility, Australia's increasing dependence on imported oil and Australia's dubious distinction of being the world's worst per capita emitter of greenhouse gases. The paper then goes on to examine 2 broad categories of taxation type actions that the Australian federal government could take: (1) Taxation and charges applying directly to fuel (2) Taxation and charges applying indirectly to fuel.

The paper concludes that the most appropriate strategy for the Australian federal government given the significant political constraints is to implement an effective wholesale price floor on crude oil at USD64/barrel, remove distortions in import tariffs and fringe benefit taxes that encourage fuel consumption and provide significant incentives for state governments to implement congestion pricing in capital cities. Theoretically superior concepts such as large increases in fuel taxes are not recommended due to the political impossibility of implementing them.

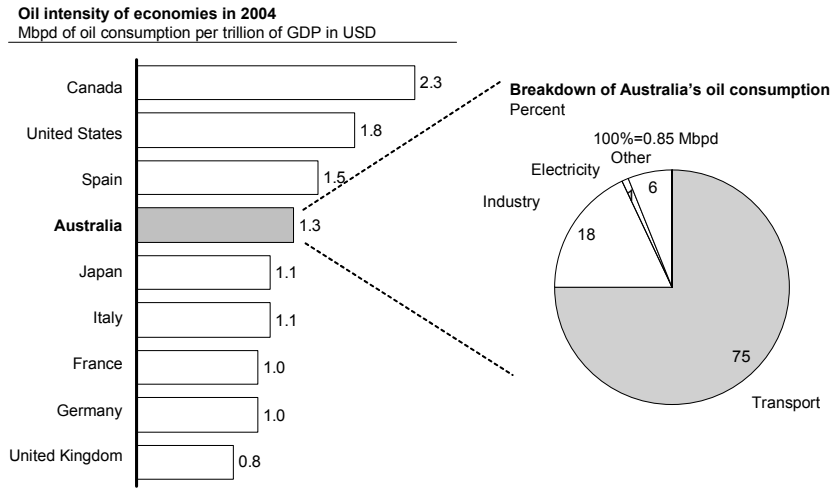
The recommended actions in this paper do not represent a comprehensive transportation energy strategy as only taxation and charges options are considered and important non-tax components such as direct support for alternative fuels and vehicle efficiency standards are not discussed. Nevertheless, the taxation and charges concepts recommended, would, if implemented, significantly reduce Australia's long term consumption of oil.

MOTIVATION FOR TRANSPORTATION FUEL DEMAND MANAGEMENT IN AUSTRALIA

As a highly urbanized nation with large inter-city distances and a 'heavy' economy skewed towards basic materials extraction and processing, Australia is a relatively intensive user of oil. Although Australia's economy is not as oil intensive as the USA and Canada (see figure 1[1]), its consumption per unit of GDP is still significant and above Japan and the major western European economies. As shown by figure 1, the vast majority of Australia's oil goes into transportation and therefore any strategy that aims to significantly reduce Australia's oil consumption must focus on transportation.

Figure 1

The Australian economy is moderately oil intensive and oil use is dominated by transport



Source: World Bank (GDP); BP Statistical Review of World Energy, 2005; Australian Government

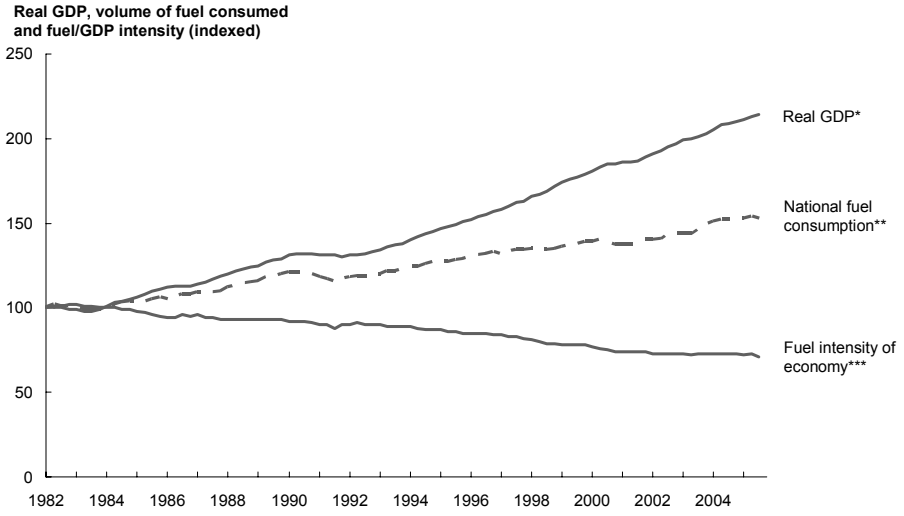
Considering the last 20 years of GDP and fuel[2] consumption in Australia as shown in figure 2, it is apparent that Australia, like most developed economies, has experienced a long term decline in the oil intensity of its economy. Total fuel consumption, however continues to

[1] All figures contained in the body of the text are also included as full page charts in the appendix
[2] In this paper unless stated otherwise, fuel refers to the sum of gasoline and diesel fuel

rise and a closer examination of the trend in fuel intensity suggests that fuel consumption has started to track GDP more closely in recent years. Specifically, the compound annual growth rate in fuel intensity of GDP for the 5 years 1996-2000 was -2.5% whereas for the 5 years 2001-2005 it was only -0.7%.[3] Given that this slowing of the decline in fuel intensity occurred in the context of significantly higher fuel prices, it seems overly optimistic to expect that GDP fuel intensity will decline significantly in a business as usual case going forward.

Figure 2

GDP oil intensity has fallen consistently but the rate of decline in intensity has slowed over the last 5 years



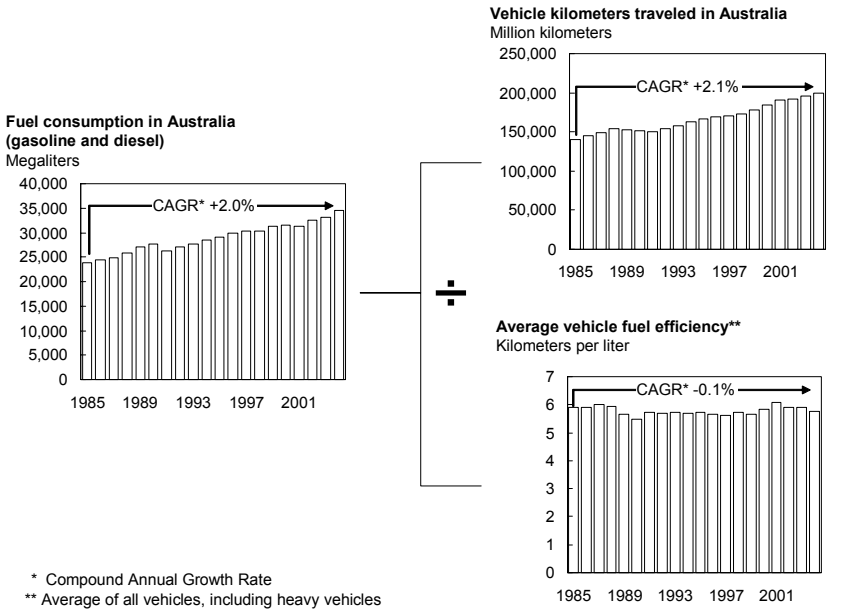
* Real GDP 12 month moving average
** 12 month moving average total volume of fuel consumption in Australia (gasoline and diesel)
*** 12 month moving average ratio of total volume of fuel consumption to real GDP
Source: Australian Bureau of Statistics, April 2006; Reserve Bank of Australia

As shown by figure 3, Australia's growth in fuel consumption is driven in aggregate by increases in kilometers traveled with fleet fuel efficiency essentially unchanged over the last 20 years. Given that kilometers traveled is probably highly correlated with economic activity, this provides further evidence that Australia's fuel consumption will continue to increase at a rate only slightly less than GDP growth.

[3] Calculations based on sources detailed in figure 2: Australian Bureau of Statistics, Reserve Bank of Australia

Figure 3

Fuel consumption growth is driven by increases in distances traveled



* Compound Annual Growth Rate

** Average of all vehicles, including heavy vehicles

Source: Australian Bureau of Statistics, Statistical yearbook 2005; ABS Motor Vehicle Census and usage surveys (multiple years)

In summary, Australia's fuel consumption is relatively high already and likely to continue to increase. Broadly speaking, there are 3 reasons why it would be in the national interests of Australia to reduce or reverse out of this position of high consumption and steady growth. They are as follows: (1) Reduce economic exposure to price volatility and supply disruptions, (2) Reduce greenhouse gas emissions and (3) Reduce local environmental externalities of fuel consumptions. These are now briefly expanded upon in turn.

1. Reduce economic exposure to price volatility and supply disruptions

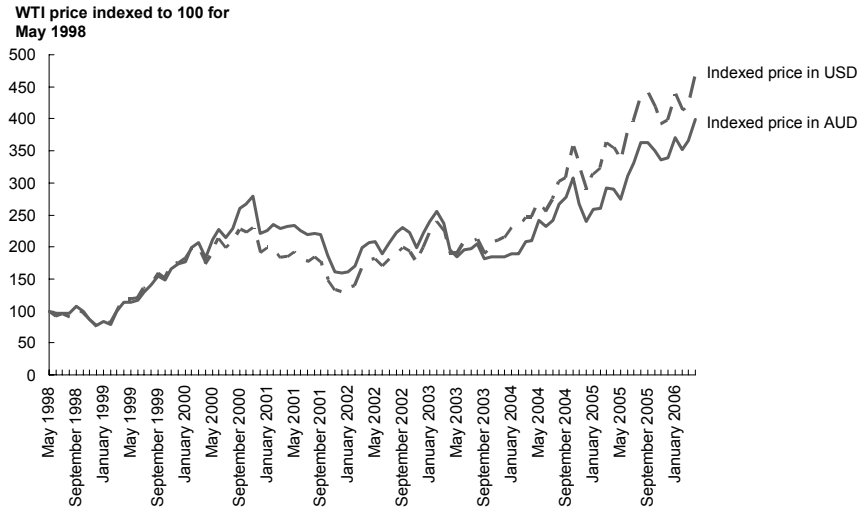
The complex mix of science, geo-politics and economics that drives global oil prices makes for a commodity whose price is fiendishly difficult to forecast. The consequent unpredictable variations in oil prices can cause significant economic disruption through a variety of mechanisms such as inflationary pressure and restructuring of manufacturing and logistics systems to maintain lowest cost. The price volatility of crude oil over the last 5 years in

particular has been significant and as shown in figure 4 for Australia, fluctuations in the Australian dollar (AUD) – United States dollar (USD) exchange rate have in some cases amplified that volatility. Given the current political uncertainty in many producing states, Australia can expect continued volatility and therefore any action that reduces the amount of oil that Australia consumes clearly contributes to macro-economic stability and growth.

Figure 4

Oil prices have been volatile and rising with USD-AUD exchange rate changes slightly increasing volatility experienced in AUD

Comparison of price history of WTI in AUD and USD



Source: EIA; Bank of Canada

In addition to the price volatility argument, there is also the potential for economic harm from short term supply disruptions. Currently, Australia's net imports of crude oil are around 33% of domestic consumption.[4] As shown by figure 5, however, this fraction is expected to rapidly expand over time as Australia's aging fields stop producing. In addition, the geographical location of Australia's fields (the majority of production is in the north and north-west close to Asian markets) as well as the composition of Australia's crude (light and sweet)[5] means that a significant fraction of Australia's crude production is directly exported. As such,

[4] Australian Bureau of Agricultural and Resource Economics, Petroleum statistics, 2006

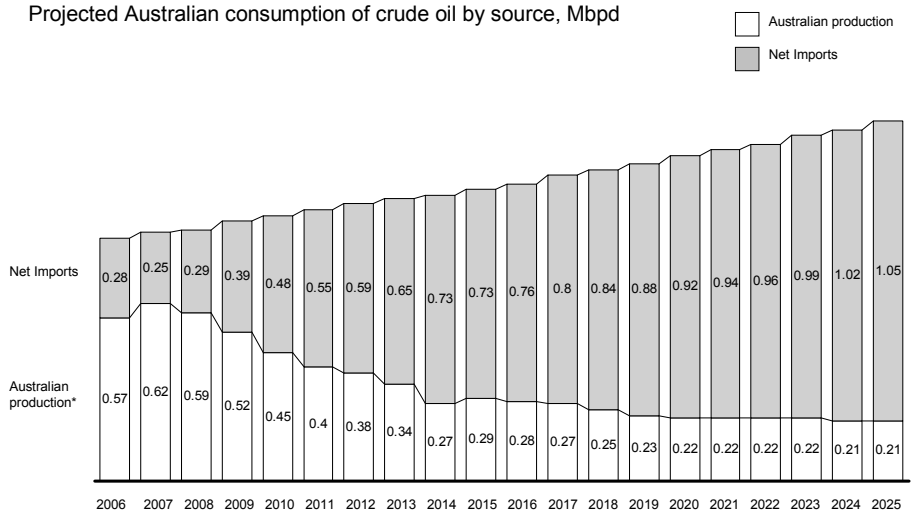
[5] 'Securing Australia's Energy Future', Department of Prime Minister and Cabinet, Australian government, 2004

the level of net imports into Australia greatly understates the existing level of integration of Australia into the global oil market. Specifically, around 67% of Australian refinery inputs are currently imported.[6]

Figure 5

Due to declining domestic production and increasing demand, Australia will become increasingly dependent on oil imports

Projected Australian consumption of crude oil by source, Mbpd



* Reference case (50% probability) from Geoscience Australia. Most optimistic scenario still shows production decline

Source: Geoscience Australia, Submission by Geoscience Australia to the Senate Inquiry into Australia's Future Oil Supply and Alternative Transport Fuels, Feb 2006; Australian Bureau of Agricultural and Resource Economics 2006

Given the tightly correlated prices of global oil, the fraction of imports does not necessarily have a significant bearing on the price volatility experienced by Australia but it does limit the ability of government to guarantee minimum supply levels in the case of a major supply disruption. As such, there is a strong motivation from a risk management point of view for the Australian government to try to limit the dependence of the Australian economy on oil.

2. Reduce greenhouse gas emissions

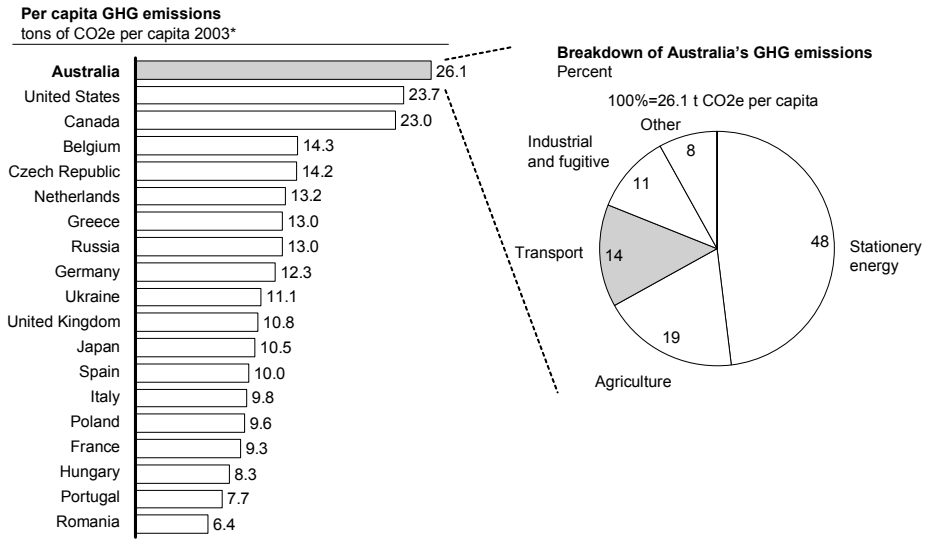
As shown in figure 6, Australia has the dubious distinction of having the highest per capita emissions of greenhouse gases (GHG) in the world. The high per capita emissions are due

[6] Ibid

to a variety of factors including most importantly a dependence on coal for electricity generation (despite having the largest reserves of uranium in the world[7], Australia has no nuclear power generation) and an extensive and GHG intensive agricultural sector.

Figure 6

Australia is the world's worst per capita GHG emitter and transport is an important driver



* For Annex 1 countries (under 10m in population omitted for clarity although Australia remains biggest emitter with all countries included)

Source: Greenhouse Gas Emissions Data for 1990 – 2003 submitted to the UNFCCC; Securing Australia's Energy Future, Australian Government 2004

Transportation, however, is also an important driver of greenhouse emissions constituting 14% of the total as shown by figure 6. Transportation is important because it is growing more rapidly than the emissions from coal (2.4% pa for transportation compared to 1.1% for coal[8]) and also because the sources are dispersed, in the hands of consumers and not suitable in the near future for technical fixes such as CO2 capture and sequestration.

A reduction in fuel consumed in transportation, therefore, is an essential element of a climate change strategy. The merits of climate change action in itself are not repeated here except to note that the federal opposition party in Australia took the remarkable step this year of calling on the government to create a new class of environmental refugees for the small Pacific

[7] 'World Energy Assessment 2000', UNDP, 2000, Chapter 5
[8] 'Securing Australia's Energy Future', Department of Prime Minister and Cabinet, Australian government, 2004

Island nations neighboring Australia that could literally be submerged by rising sea levels.[9] As the world's worst per capita greenhouse gas emitter, Australia accepting refugees from drowned neighboring countries would be a particularly shaming experience.

3. Reduce local environmental damage of oil consumption

In addition to the global climate change problem, oil consumption in transportation causes significant localized pollution. Australian cities have relatively clean air by international standards but there are still localized problems, especially in Melbourne and Sydney and recent data suggest that despite progress on reducing volatile organic compounds, emissions of particulates have been steady and NOx emissions have been increasing.[10] Although emissions may also be addressed by improving vehicle engine technology, fleet turnover is slow with only 7% replacement each year[11] and so reducing total fuel consumption may be a more rapid way to curb pollution. As such, there remains a strong incentive, especially in the major metropolises of Melbourne and Sydney, to reduce fuel consumption to improve local air quality.

Summary of motivation for fuel demand management

Overall, therefore, there is a strong motivation to reduce Australia's consumption of oil in transportation. The rest of this paper assesses the options that the Australian federal government has in terms of taxation and charges to achieve this objective. As stated previously, taxation and charges approaches do not alone constitute comprehensive transport energy policy but are nonetheless powerful and politically explosive options that warrant close examination.

---

[9] 'Australia must take 'climate refugees'' AAP bulletins, 5 January 2006
[10] 'Managing Victoria's air quality', Victorian Government, June 2002
[11] 'Submission to Senate Inquiry into Australia's future oil supply and alternative transport fuels', National Committee on Transport Engineers Australia, 2006

DIRECT TAXATION AND CHARGES OPTIONS

Changing the direct taxation of fuel is perhaps the most effective and certainly the most controversial of all actions that the federal government could take to reduce fuel consumption. This section describes briefly how the current fuel taxation system works and then describes the fuel consumption, economic, social/environmental and political impact of increasing taxation before concluding with a recommendation that the government should lock in the current level of retail prices through a flexible tax that maintains an effective retail price floor.

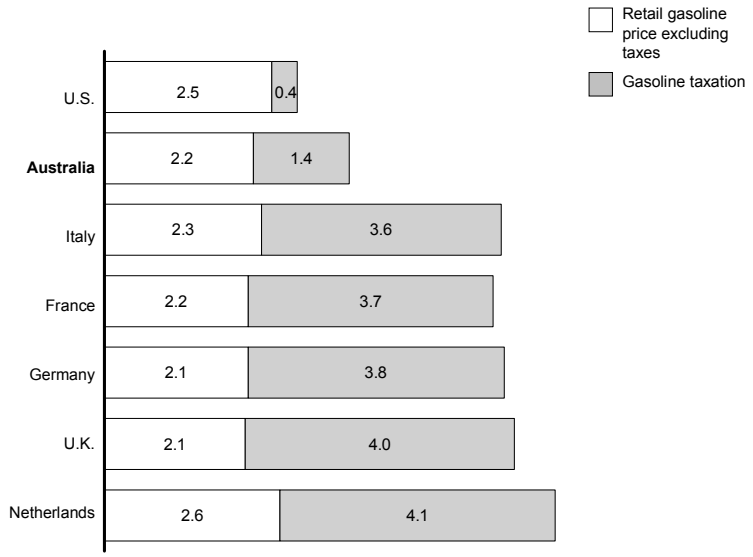
Current taxation of fuel in Australia

Current fuel taxation in Australia has two components: (1) an AUD0.3814/liter flat excise and (2) a 10% Goods and Services Tax (GST – Australia's value added tax) levied on the final pump price (including the excise amount). These taxes are relatively low compared to most OECD countries as shown by figure 7 but are significantly higher than the United States.

Figure 7

Australia's fuel taxation is relatively low compared to Europe

USD per gallon of retail gasoline for week of 10-Apr-2006



Source: EIA; AIP fuel watch

Importantly, both of the taxes that are applied to fuel are collected by the federal government and it is clearly within the power of the Australian federal government to increase or decrease the excise tax. The excise tax currently does not apply to biodiesel and ethanol (although the GST does).

Fuel consumption impact of increasing direct taxation

Increasing direct taxation of diesel and gasoline would induce both demand and supply side responses that would result in a decrease in consumption of diesel and gasoline.

On the demand side, most obviously, an increase in the rate of taxation would increase the pump price of fuel and induce consumers to purchase less. Lower purchases in the short term could be a reflection of limiting discretionary travel, changing modes or vehicle sharing. In the longer term, these changes could be reinforced by changes in stickier variables like the fuel efficiency of purchased vehicles and urban density. Such short run and long run demand side responses make perfect economic sense and can be observed for historical changes in the pump price in Australia. The magnitude of theses response, however, if relatively small with the Reserve Bank of Australia putting the price-demand elasticity of fuel consumption at around -(0.1–0.2) in the short term and -(0.5–0.6) in the long term.[12] That means that if a 25% long term reduction in fuel consumed were desired then a 42–50% increase in the pump price would be required which at current prices means an increase in the level of taxation of 153–184%. This huge increase in taxation necessary to effect a significant demand response makes for significant political complications in applying it as a demand management tool. In addition, to achieve the long term elasticity response of -(0.5–0.6), the increase in retail price would need to be

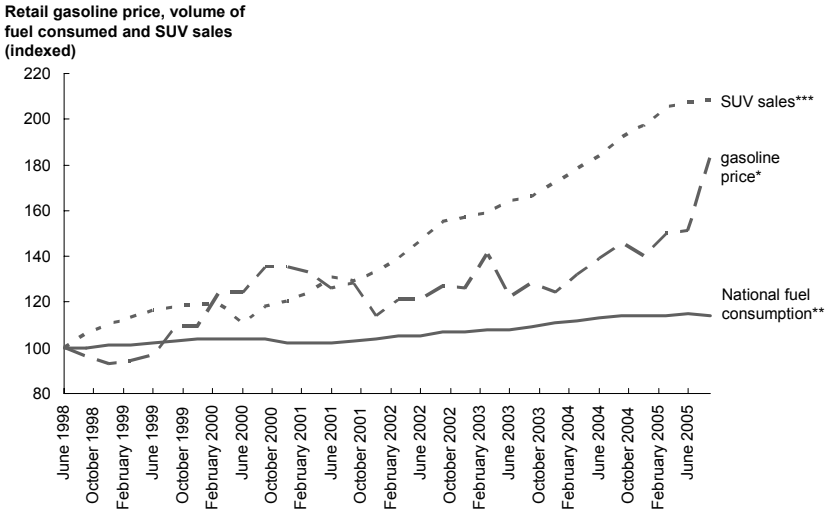
[12] 'Statement on Monetary Policy', Reserve Bank of Australia, 7 November 2005

perceived as permanent, a requirement that may be undermined by consumer memory of the historic volatility of retail gasoline prices that could easily wipe out even a significant tax increase.

In summary, then, direct taxation is a somewhat limited tool for managing fuel demand. This is illustrated by figure 8 which shows that despite significantly rising fuel prices over the past 5 years, total fuel consumption has not departed noticeably from its steady growth trajectory. In addition, as shown by figure 8, there is little hope of delayed longer term effects as sales of fuel hungry SUV—in some ways a leading indicator of future fuel demand—have continued to grow rapidly.

Figure 8

Australian consumers have only very weakly responded to rising gasoline prices



* Monthly retail average in metropolitan Sydney
** 12 month moving average total liters of fuel consumption in Australia (gasoline and diesel)
*** 12 month moving average new vehicle SUV sales in Australia
Source: FuelTrac Pricing Summary Australia; Australian Bureau of Statistics, April 2006

What then of the supply side response? The supply side response to increased direct taxation on fuel is based on the assumption that the alternative fuels ethanol and biodiesel remain excise free as is currently the case and therefore increasing taxation of gasoline and

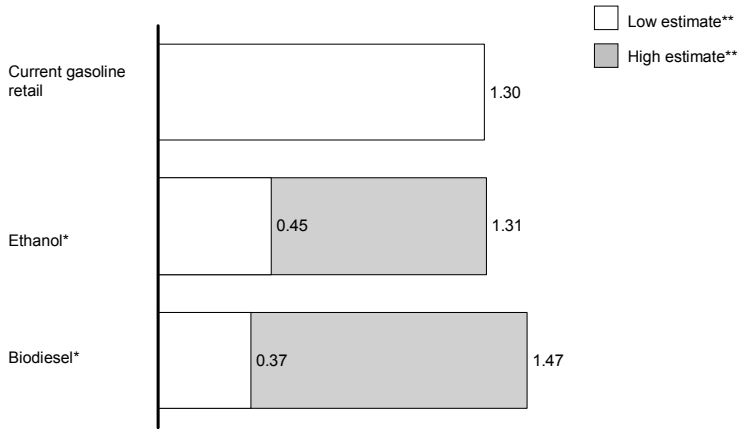
diesel makes the production of these alternatives fuels relatively more attractive and so increases their supply.

Biofuels are not currently produced on any large scale in Australia with current production around 29 Ml or 0.08% of total consumption.[13] As such, there is significant uncertainty about the true costs of production at any large scale. A recent Government report examined the cost structure of increasing biofuel production with the conclusion that at current crude oil prices, significant levels of biofuel production were economic but that expectations of easing crude prices making investments unprofitable in the future would significantly limit current investments.[14] The comparison of effective retail prices achievable from biofuels with the current gasoline price is shown in figure 9 demonstrating the economics that suggest that if current high prices were certain, significant investment would occur.

Figure 9

At current oil prices ethanol and biodiesel are competitive in Australia

Current gasoline and effective ethanol and biodiesel prices, AUD/liter*



* Ethanol and biodiesel prices converted to energy equivalent basis and to reflect gasoline/diesel differential in Australian retail prices for the case of biodiesel, assumes ethanol and biodiesel remain excise free

** Incorporates range of assumptions on capital, operating and feedstock costs considered by Australian government report to be reasonable over medium term

Source: Australian Government, 'Appropriateness of a 350 million litre biofuels target', 2003; Caltex

[13] 'Biofuels fact sheet', Australian Government Department of Industry, Tourism and Resources, 2006

[14] 'Report of the biofuels taskforce to the Prime Minister', Australian Government, August 2005

Current biofuel production in Australia is dominated by ethanol produced from wheat starch and C molasses (the sugar cane by-product). Importantly both wheat and sugar are two major crops for which Australia is one of the world's lowest cost producers[15] implying that they may be suitable as long term local feedstocks. The success of Brazil in producing ethanol from sugar cane should also be encouraging in this respect with their production costs, if replicated in Australia, translating into a pump price of AUD0.40/liter[16] which from comparison to figure 9 would be highly profitable.

Overall then, increasing direct taxation could have a significant stimulus for investment into biofuel production in Australia if it pushed investors' expectations of the future pump price of gasoline to around the current level of AUD1.20-1.40/L. In addition, increased taxation could also stimulate further research into more advanced biofuel production processes such as ethanol produced from cellulosic feedstocks that are generally considered to have the best potential for long term, large scale production.

Economic impact of direct taxation

The economic impact of higher retail fuel prices is a topic of considerable debate both in Australia and around the world given the recent increases in oil prices. There is no theoretical or empirical consensus on the magnitude of the macroeconomic effects of significant oil price rises for developed economies with some arguing that appropriate monetary policy can almost fully

[15] 'A trade view of the future of sugar in the region', Proceedings of the Fiji/FAO 1997 Asia Pacific Sugar Conference and 'Competitiveness of wheat production', JY Longchamp ARVALIS Institut du végétal (France), European Wheat Event proceedings, 2005
[16] 'ANZ Industry brief: automotive biofuels', December 2005

absorb the shock[17] whilst others arguing that based on empirical evidence a significant reduction in output is unavoidable,[18] some even suggesting a oil price-GDP elasticity in the United States of around -0.055.[19] A high profile IEA/IMF report of 2004 estimated that increasing oil prices from USD25/barrel to USD35/barrel would shave 0.4% off OECD GDP.[20]

It seems that many of the arguments made for and against fuel price increases having a significant economic impact in the US or EU can be applied to Australia and so unfortunately there is no clear message about the exact economic impact that raising direct taxation of gasoline and diesel would have on Australia's economy either. To put some bounds on the potential impact, however, it is helpful to consider some broad measures of the importance of fuel from both a consumer and macro-economic perspective within Australian.

From a consumer spending perspective, it is interesting to consider what share of household expenditure actually goes into fuel. As shown by figure 10, transportation spending is on average 15% of total household expenditure but expenditure on fuel is only a small fraction of this meaning that fuel costs are only 3.5% of total household expenditure. Considering only the taxation component of fuel cost the share goes down to 1.3%. As highlighted by figure 10, car expenses in Australia are dominated by capital costs with registration and insurance costs and service each being roughly as large as fuel. This relatively small importance of fuel as a component of household spending is consistent with the relatively weak consumer response to higher fuel prices as noted in the previous section but also implies that increasing retail gasoline

---

[17] See for example James Douglas Hamilton; Ana Maria Herrera 'Oil Shocks and Aggregate Macroeconomic Behavior: The Role of Monetary Policy: A Comment' and 'A Reply' Ben S. Bernanke; Mark Gertler; Mark W. , The Journal of Money, Credit and Banking, Vol. 36, No. 2. (May, 2004) and Leduc, Sylvain; Sill, Keith 'A Quantitative Analysis of Oil-Price Shocks, Systematic Monetary Policy, and Economic Downturns', Journal of Monetary Economics, vol. 51, no. 4, May 2004, pp. 781-808

[18] Jimenez-Rodriguez, Rebeca; Sanchez, Marcelo, 'Oil price shocks and real GDP growth: empirical evidence for some OECD countries' Applied Economics, vol. 37, no. 2, February 2005, pp. 201-28

[19] Jones, Donald W; Leiby, Paul N; Paik, Inja K, 'Oil Price Shocks and the Macroeconomy: What Has Been Learned since 1996', Energy Journal, vol. 25, no. 2, 2004, pp. 1-32

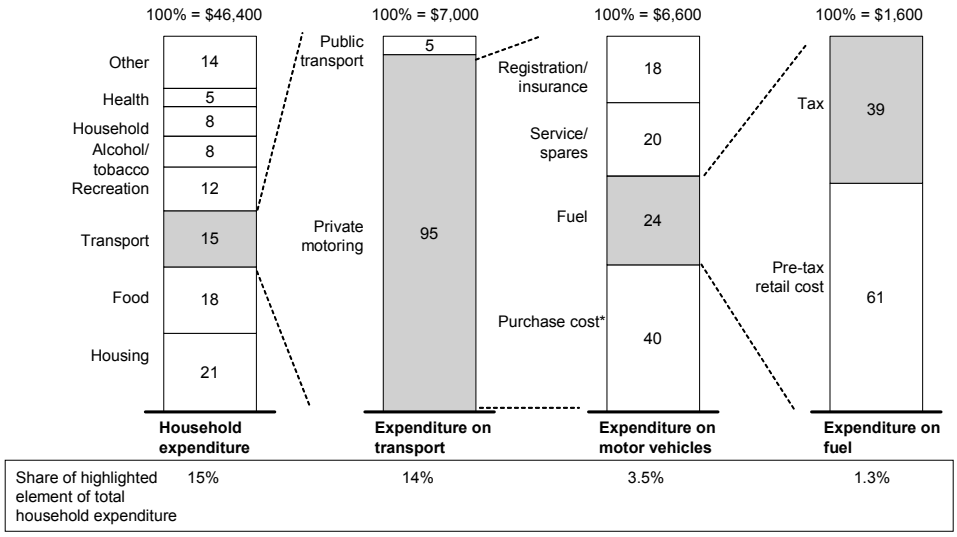
[20] 'Analysis of the Impact of High Oil Prices on the Global Economy', International Energy Agency, May 2004

prices will not have a recessionary flow through effect by slowing consumer spending on other elements as has been reflected in economic analysis of recent price rises in Australia.[21]

Figure 10

Fuel is only a small part of the overall cost of transportation

Decomposition of annual household spending on transport, percent



* Annual average only—actual depreciation and financing cost would be significantly higher for newer cars

Source: Australian Bureau of Statistics 2004 Household Expenditure Survey; Austroads RoadFacts 2005

In addition to the consumer spending argument, the other off cited fear of rising gasoline prices is that they will build in higher costs to a whole range of goods and services and so reduce aggregate consumption. Anecdotal evidence suggests that in perhaps the most important category of foodstuffs, higher fuel costs in Australia have been largely absorbed by producers as they scramble to improve the efficiency of their distribution systems.[22] More concretely, however, total economy wide expenditure on oil derived products is only 2.2% of GDP compared to 6% at its peak in the late 1970's[23] and this large shift results in predictions of a

[21] 'Economic Issues: How dangerous are high petrol prices', Commonwealth Bank of Australia Research note, September 2005

[22] 'The big squeeze', The Age, April 22, 2006

[23] 'Statement on Monetary Policy', Reserve Bank of Australia, 7 November 2005

greatly weakened effect of changes in retail fuel prices compared to 20-30 years ago in Australia.[24]

In addition to all these arguments that point to only a modest economic impact of rising retail fuel prices, it is important to note that most of them disappear completely if the price rise is caused by an overall revenue neutral shift in taxation. That is, if an increase in direct taxation on fuel is offset by a reduction in other forms of taxation then most of the macro-economic arguments around limiting GDP no longer apply.

In summary, then, there is good reason to believe that the aggregate economic effect of increasing direct taxation of fuel will be relatively modest in Australia. As pointed out by the Governor of Australia's reserve bank, even the recent trebling in crude oil prices has not derailed growth, commenting that 'virtually all of the rise in oil prices [USD20 to USD70 per barrel] has by now been reflected in statistics on inflation and GDP growth, and the results have been surprisingly small.'[25]

Equity and environmental impact of direct taxation

Fuel taxation in Australia is popularly perceived as a highly regressive form of taxation as most people presume that fuel expenditure in dollar terms is relatively constant across income brackets and therefore declines as a share of income for wealthier households. The data on Australian household expenditure, however, do not support this perception since as shown in figure 11 spending on fuel is relatively constant as a share of income across income quintiles. As such, fuel taxation is neither significantly regressive nor progressive at the income quintile

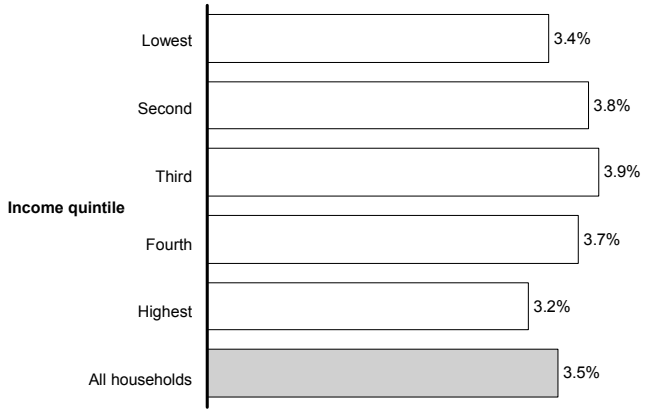
[24] Valadkhani, Abbas; Mitchell, William F, 'Assessing the Impact of Changes in Petroleum Prices on Inflation and Household Expenditures in Australia', Australian Economic Review, vol. 35, no. 2, June 2002, pp. 122-32
[25] Macfarlane, I.J. 'Some Observations on Recent Economic Developments: Talk to Australian Business Economists Annual Forecasting Conference Dinner', Sydney - 13 December 2005

level and therefore at first glance increasing direct fuel taxation would not have a severe equity impact in Australia.

Figure 11

Fuel taxation is neither strongly regressive nor progressive

Share of annual household spending on fuel by income quintile



Source: Australian Bureau of Statistics 2004 Household Expenditure Survey

This high level conclusion, however, has been challenged by recent research in Australia that suggests that the income quintiles mask a significant equity issue for an important underprivileged urban minority.[26] Specifically, the research argues that there is a significant group of low income households that have been pushed out to the urban fringe to find affordable housing that are now highly dependent on private vehicle use to access employment and services and are therefore highly exposed to increases in fuel taxation. This argument makes intuitive sense given the extent of urban sprawl in Australia's capital cities and therefore any increase in direct fuel taxation would need to be accompanied by offsetting measures to address such equity concerns for this particular group and any others that may be disproportionately affected.

[26] Dodson, Jago and Sipe, Neil, 'Oil Vulnerability in the Australian City', Urban Research Program, Research Paper 6, Griffith University, December 2005

On the environmental dimension, the impact of increasing direct fuel taxation is clearly positive insofar as it reduces the amount of gasoline and diesel consumed and therefore the local and global environmental damage. The supply side response of increasing biofuel production, however, is more complicated. Overall, however, the emerging scientific consensus in Australia is that biofuel production as it is likely to occur in Australia will result in net environmental benefits in terms of local air quality and total greenhouse gas emissions, although the extent of the benefits are still very uncertain and dependent on the exact processes and feedstocks that are employed.[27]

Political impact of direct taxation

Berkley economist Brad DeLong recently captured the general bi-partisan tendency in the United States to flinch at higher gas prices:

'Democrats are (because of the environmentalist wing of the party) generally in favor of higher gasoline taxes and higher gasoline prices—except when gasoline prices are high. Republicans are in favor of letting oil markets "work"—except when gasoline prices are high'[28]

Such bipartisan paralysis in the face of higher fuel prices is also evident in Australia, although perhaps not as extreme with no US styled discussion of a fuel rebate and some serious discussion in Australia of increasing investments in alternative fuels.[29] Nevertheless, the conservative government in Australia has responded to recent rises in gasoline prices fairly limply by simply pointing out the geo-political drivers out of their control and requesting that the Australian Competition and Consumer Commission (Australia's competition watchdog)

[27] 'Report of the biofuels taskforce to the Prime Minister', Australian Government, August 2005
[28] DeLong, Brad, 'Covering the Economy: Gasoline Prices' Brad DeLong's Semi-Daily Journal, http://delong.typepad.com/sdj/
[29] Kim Beazley, Press Conference 28th April 2006, http://www.alp.org.au/media/0406/pcloo280.php

look again at the oft cited but never proved issue of price gouging.[30] Such a response largely mimics the Bush administration's response in the US which the Financial Times neatly summed up as so far being 'inconsequential populism.'[31]

In both the US and Australia the underlying driver of political paralysis on petroleum is probably the hugely emotive response of voters to pump prices. This consumer engagement which is clearly out of all proportion to the true share of wallet for consumers that fuel makes up (see figure 10) is due probably to the fact that it is the only true commodity purchase of significance for most households and so there is naturally an uncommon focus on price. Combining this with the emotional importance of perceived mobility given the large distances of Australia means that increasing direct taxation, especially in light of recent price rises, amounts to political suicide and is truly non-partisan in the sense that neither party would touch it.

As such, it appears that increased direction taxation, despite having a desirable impact on consumption without significant economic, environmental or equity concerns, will not be possible due to the significant political barriers.

Recommendation: Modify federal excise to set effective price floor at USD 64/barrel

Given that increasing direct taxation is not politically possible, what then is a politically achievable alternative that makes sense? The most interesting and attractive option is to use a flexible tax to set an effective retail price floor at or slightly below the current price level.

[30] 'Costello defends petrol companies', The Age, April 7, 2006
[31] 'Bush runs on empty - His plan to restrain petrol prices is almost content-free', Financial Times, 27 April 2006

The concept of a price floor for oil has been raised in the United States by multiple parties but is yet to gain widespread support. Republican Senator Dick Lugar has advocated a 'revenue-neutral $35 per barrel price floor'[32] whilst Thomas Friedman of the New York Times floated the idea of a retail price floor of around USD3.50-4.00/gallon[33] as has Charles Krauthammer of the Washington Post at USD3.00/gallon.[34] Henry Lee of the Kennedy School of Government at Harvard has also advocated the concept of a price floor[35] and has mentioned a USD40-45barrel as a possible floor level.[36] Vinod Khosla the Sun Microsystems founder has also advocated a price floor at USD40/barrel as part of his advocacy of alternative fuels.[37] Despite this discussion in the United States, the concept of a price floor does not seem to have entered the policy debate in Australia with no mention of the price floor concept being found in a search of major Australian press.

Mechanics of a price floor

The mechanics of a price floor in Australia would be for the Australian government to amend the fuel excise legislation to include a variable component that would be directly related to the difference between benchmark oil measured in AUD and a predetermined level. To describe this variable component precisely, it is necessary to establish the empirical relationship between crude oil prices and retail fuel prices. This is done by examining the historic correlation between the price of WTI[38] in AUD and the retail price of fuel in Sydney in AUD as shown in

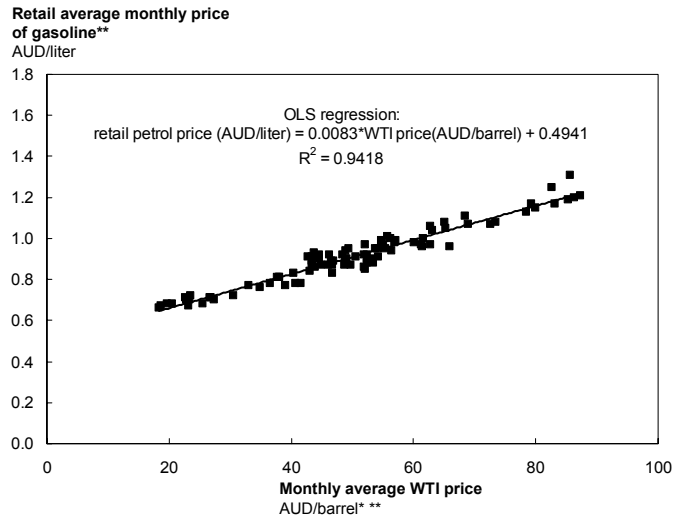
[32] Lugar, Richard, 'U.S. Energy Security – A New Realism: address to the Brookings Institution', March 2006
[33] Friedman, Thomas, 'The New 'Sputnik' Challenges: They All Run on Oil', New York Times, January 20, 2006
[34] Krauthammer, Charles, 'Tax and Drill', Washington Post, Friday, May 21, 2004
[35] Lee, Henry, 'Tame oil's wild price ride with a tax', Christian Science Monitor, April 13, 2006
[36] Interview on National Public Radio, 4 May 2006
[37] 'A healthier addiction', The Economist, March 23 2006
[38] The oil benchmark that Australia prices are most highly correlated to is probably Malaysian Tapis, however the price floor here is developed based on the WTI benchmark for ease of comparison and data availability

figure 12. As expected, the AUD price of WTI and the retail pump price are tightly correlated with the OLS regression given by:

Retail gasoline price (AUD/liter) = 0.0083*WTI price (AUD/barrel) + 0.4941

Figure 12

Retail fuel prices in Australia are tightly correlated with AUD price of WTI



* WTI quoted at historic USD-AUD exchange rates
** Sample period is from May 1998 – March 2006 for metropolitan Sydney gasoline prices
Source: EIA; Bank of Canada; FuelTrac

Therefore to set an effective retail price floor at around P_{floor}, an extra excise of $E_{variable}$ in AUD/liter would be needed given by:

$E_{variable} = \max(0, P_{floor} - 0.0083WTI - 0.4941)$, where WTI is measured in AUD/barrel

For example, to lock in current retail prices of around AUD1.2/liter, $E_{variable}$ would be set to $E_{variable} = \max(0,1.20 - 0.0083WTI - 0.4941) = \max(0,0.7059 - 0.0083WTI)$ which would mean the variable excise would only be charged if the WTI price fell below AUD85.0/barrel (at current exchange rates this equates to USD63.8/barrel). Although fluctuations in the WTI benchmark occur daily, for ease of implementation it would also probably be necessary to use a one month trailing average figure, reviewed monthly.

Such a variable excise would not fix an exact retail floor since the excise would depend only on the WTI benchmark and the USD-AUD exchange rate and therefore there would still be the same incentive for competition and improvements in the refining, distribution and retail costs associated with fuel. Such costs, however, are both relatively small and already highly competitive (as evidenced by the high correlation between WTI and retail prices shown in figure 12) meaning that it would be unlikely for the actual retail price to ever dip more than a few percentage points below the nominal retail floor.

Benefits of a price floor

Such a variable excise is a desirable taxation policy because it achieves significant demand benefits without being politically suicidal.

The benefits of a price floor excise are from its effect of removing uncertainty about future minimum prices. If the variable excise was implemented at the AUD1.2/liter level as described above both gasoline and diesel consumers and producers of alternative fuels would be able to make long term consumption and investment decisions knowing that the retail price of gasoline would never fall below AUD1.2/liter. For consumers, this would significantly increase the attractiveness of making long term investments in lower fuel consumption such as buying more fuel efficient vehicles and revising their housing decisions whilst for alternative fuel producers, a retail price floor at AUD1.2/liter would encourage significant investment in new capacity that would be guaranteed to be profitable (see figure 9).

In effect, a variable excise as described amounts to the Australian government taking out a put option at the price floor level (eg AUD85/barrel in the example described) for Australia's fuel demand against the Australian public. If the future prices of WTI remain above the effective

floor level (AUD85/barrel in the example) then the policy is unquestionably a success since the option is never exercised but the Australian economy would have had the head-start of adjusting in advance to the long term price shift. If WTI falls below the floor level, then the policy is also a success since it then becomes a politically acceptable way of achieving increased direct taxation of fuel which for the reasons previously explored is desirable on its own. In addition to the benefits of increased direct taxation, the price floor also would have also caused more significant shifts in consumption patterns and alternative fuel production due to removing the uncertainty as described above.

The intuitive value of a price floor is supported by empirical research into the effect of uncertainty of future oil prices on the response of firms to changes in oil prices recently published by Kuper and van Soest.[39] Their empirical study found that uncertainty over future prices was a significant factor limiting the demand response of firms to changes in oil prices. They also concluded that the effect was asymmetric, that is uncertainty played a bigger role in limiting adjustments to price increases as opposed to price decreases which again enforces the value of a price floor. A recent paper published in the Federal Reserve Bank of St. Louis Review also looked explicitly at the macroeconomic impact of price volatility and concluded that it was also an important driver of GDP effects and in some cases more significant than price increases themselves. Specifically they concluded that an oil price increase from '$40 to $50 per barrel generally matters less than increased uncertainty about the future direction of prices (increased volatility).'[40]

[39] Kuper, Gerard H; van Soest, Daan P, 'Does Oil Price Uncertainty Affect Energy Use?' Energy Journal, vol. 27, no. 1, 2006, pp. 55-78

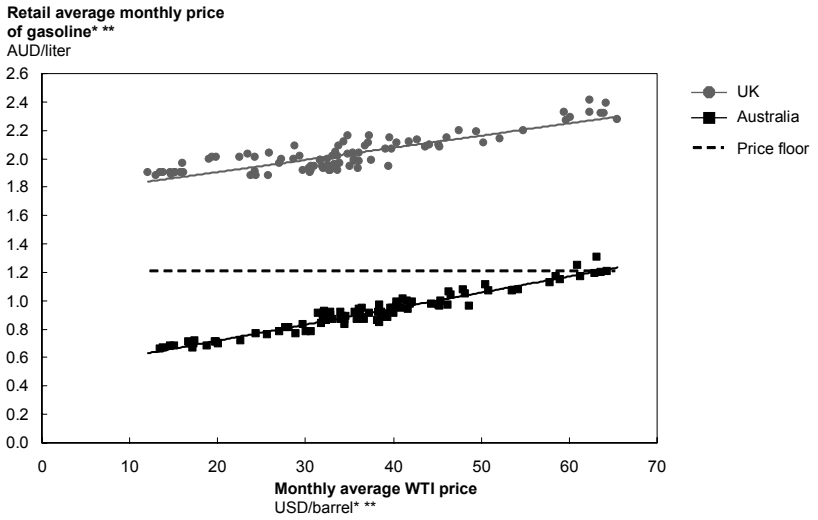
[40] Guo, Hui; Kliesen, Kevin L, 'Oil Price Volatility and U.S. Macroeconomic Activity', Federal Reserve Bank of St. Louis Review, vol. 87, no. 6, Nov.-Dec. 2005, pp. 669-83

Potential criticisms of a price floor

There are three potential criticisms of price floor taxation regime that are worth addressing. Firstly, it could be argued that in a scenario of significantly falling crude prices, a price floor would inflate Australian fuel prices relative to the rest of the world to such an extent that Australia would become economically uncompetitive due to higher costs of production from embedded fuel costs in goods and services. Such a concern, however, is not borne out by an analysis of existing price differentials. As shown by figure 13, with a price floor implemented at a nominal AUD1.2/liter, even if WTI prices collapsed to USD10/barrel, the existing huge differential in taxation would mean that retail fuel in the UK would still be roughly 50% more expensive than in Australia.

Figure 13

A price floor would not make Australian retail prices more expensive than European, even if oil prices fall dramatically



* WTI and UK pump price adjusted to remove effects of variations in AUD-USD-GBP fx rates over sample period (today's rates used)

** Sample period is from May 1998 – March 2006

Source: EIA; Bank of Canada; FuelTrac; Department of Trades and Industry, United Kingdom

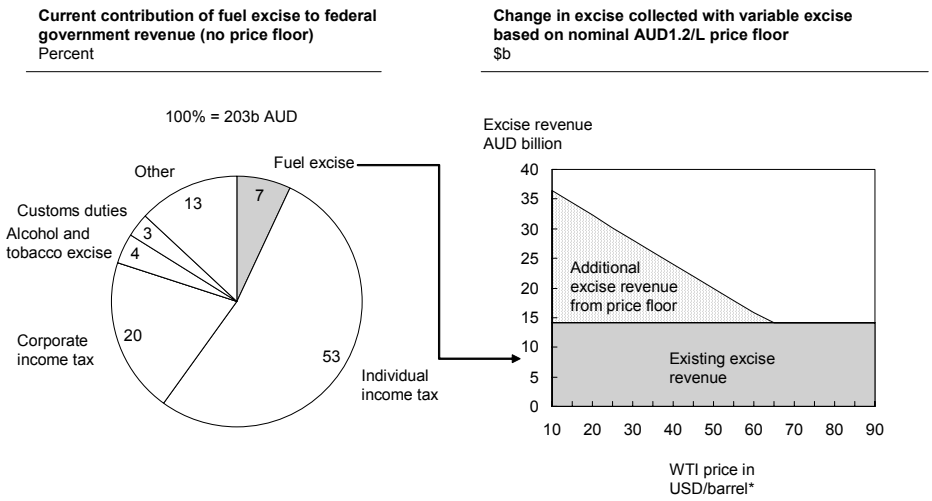
The second criticism would be a concern as to what the Australian government would do with the significant amounts of revenue raised under a falling crude price scenario. As shown by figure 14, fuel excise is already a significant source of revenue for the federal government and if

the price floor were set at the nominal AUD1.2/liter and WTI prices fell to USD30/barrel then the amount of total excise collected would roughly double and so increase the federal government total revenue by around 7%. Clearly then, there is at least the potential for significant extra revenue to be collected by government and so a price floor taxation system would need to carefully plan for what to do with such revenue if prices did indeed fall.

Figure 14

Fuel excise is already an important income stream for the federal government and a price floor could result in significant extra revenue

Australian federal government revenues 2004-05 AUD



* Assuming today's exchange rates

Source: Australian Government, Budget Paper Number 1, 2005-06 Budget; linear regression developed previously for WTI prices and variable excise amount

The solution that makes best political and economic sense would be to recycle the extra revenue in the form of tax cuts in other areas. From an economic perspective, it would probably make most sense to cut personal and/or corporate taxation however for political reasons it would probably be more acceptable to initially recycle the extra tax collected as reduced vehicle registration fees. Currently around AUD4.3b is collected in registration fees annually in Australia.[41] This would roughly be the extra revenue collected if WTI fell to USD50 a barrel with the nominal AUD1.2/liter price floor. Beyond such a fall, the extra revenue would have to

[41] 'Road Facts 2005, An overview of the Australian and New Zealand road systems', Austroads, 2005, extrapolating 2000 figures to 2005

be recycled through cuts to personal or corporate tax rates. In either case, the biggest challenge would be managing the uncertainty of the size of the incremental revenue stream and the offsetting tax reduction. To make such a system work, the tax reduction would probably need to be an end of financial year adjustment to tax rates payable with some dampening mechanism such as a federal reserve fund to smooth rate variations from year to year.

The final important criticism of a price floor approach would be that since a price floor tax is ultimately always reversible by federal parliament, both consumers and producers may not believe that it will actually be enforced in a scenario of falling prices and therefore will not fully adjust as predicted. This is indeed a serious challenge for a price floor approach and so every effort would be needed to make the flexible excise law more difficult to reverse. This could include gaining explicit bipartisan support for the concept, setting up a semi-independent body with its own authority to collect and administer the flexible tax and at the extreme creating a law that can only be reversed by a joint sitting of parliament.[42] Such measures would be important to reduce both the perceived and real risk of a policy reversal in the face of falling oil prices.

With careful implementation as described, a price floor is a workable and powerful solution to the tension between the economic benefits and political cost of increased direct fuel taxation.

[42] The legal precedent and mechanism for doing this were not investigated

INDIRECT TAXATION AND CHARGES OPTIONS

In addition to taxing fuel directly as discussed above, the Australian federal government has an important ability to indirectly tax or charge fuel consumption at the federal level and also influence how the state governments of Australia apply their own indirect taxes on fuel. This section of the paper discusses what actions that the federal government could take to reduce gasoline and diesel consumption through these two channels. That is: (1) modifying its own (federal) indirect taxation system on fuel and (2) the federal government influencing the states to modify their indirect fuel taxation regimes.

Federal Government indirect taxation

The Australian federal Government currently has two main indirect taxation mechanisms for influencing fuel demand; fringe benefits taxation and import tariffs on vehicles.

Fringe benefits tax

Fringe benefits tax (FBT) applies to motor vehicles that are 'salary packaged' when an employee opts to receive a vehicle (and potentially fuel and maintenance) in lieu of part of his or her cash remuneration. This benefit is taxed in a way that is effectively lower than the personal income tax rate for most employees on an average or above income. In addition to this across the board concession, FBT for vehicles is designed to actually reduce as the total number of kilometers traveled increases as set out in the following table:[43]

[43] 'Sustainable Cities', House of Representatives Standing Committee on Environment and Heritage, Australian Government, August 2005

Kilometers traveled per year	Statutory tax rate
0-14,999	26%
15,000-24,999	20%
25,000-39,999	11%
40,000 and above	7%

This apparently bizarre incentive structure rewards increased vehicle use with lower taxation. The original rationale for such a system was the idea that kilometers traveled are a proxy for the share of vehicle use that is business use (as opposed to personal use). There is no requirement, however, to prove business use and so the current system clearly decreases the overall marginal cost of driving for all purposes and so induces more fuel consumption. In total, it is estimated that the FBT system for vehicles provides a $750m tax break to vehicle use annually.[44]

In a recent inquiry into sustainable cities, a federal bipartisan committee recommended that these incentives be reversed[45] and this recommendation is fully endorsed here. Removing salary packaging of vehicles in a phased manner to ensure political acceptability (ie decreasing allowances each year) would have unambiguously positive fuel consumption and economic benefits by reversing an incentive that works in a clearly counter-productive direction.

Import tariffs

The other major indirect taxation that the federal government is responsible for is the import tariff regime on new vehicles. As part of a long term plan to move away from protectionism in auto manufacturing, Australian vehicle import tariffs have been steadily declining and for most vehicles are now 10%. SUVs are, however, an exception and are only

[44] Ibid
[45] Ibid

taxed at 5%.[46] This discrepancy was originally motivated by the federal government's desire to lower costs for primary producers, principally in agriculture, who use such vehicles however SUVs have surged in popularity for general use and now constitute over 20% of total new vehicle sales.[47] The discrepancy in taxation between SUVs and other passenger vehicles is scheduled to be eliminated in 2010 when all tariffs will equalize at 5%[48] however given their vastly inferior fuel economy performance, there is a strong case to equalize the tariffs immediately to manage fuel demand. The bipartisan committee on sustainable cities also recommended such an increase with direct offsetting concessions for primary producers and again this sensible recommendation is endorsed here.[49]

State government indirect taxation and charges

Beyond the relatively minor indirect fuel taxes discussed above that are the domain of the federal government, the state governments in Australia have the responsibility for the vast majority of indirect taxation and charges related to fuel consumption. State governments collect license and registration fees and it would be State and local governments that would impose any kind of congestion or user fees on road networks. The federal government cannot itself apply such charges but through conditional funding either on roads or other major areas of expenditure, it could reasonably influence states' implementation of such schemes, especially if it demonstrated such measures to be in both regional and national interests.

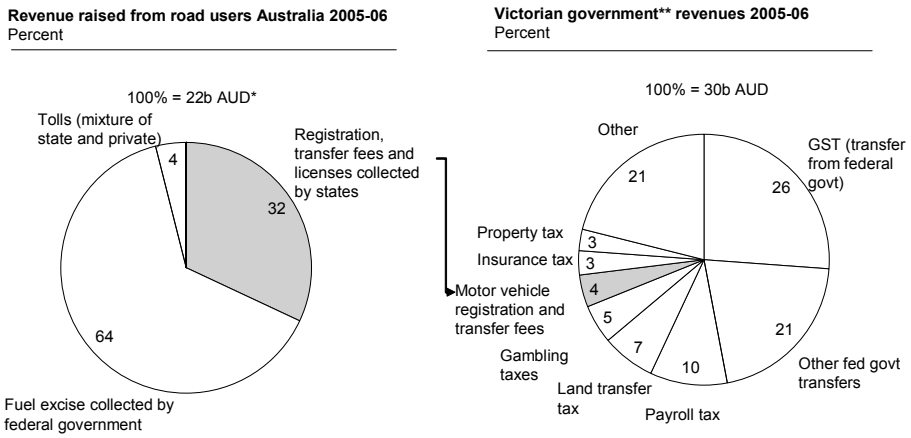
The composition of existing revenue raising from road users and how this contributes to the revenues of the example state of Victoria are shown in figure 15. As can be seen from figure

[46] 'Cut and run' The Age, January 12, 2005
[47] 'Sustainable Cities', House of Representatives Standing Committee on Environment and Heritage, August 2005
[48] 'Cut and run' The Age, January 12, 2005
[49] 'Sustainable Cities', House of Representatives Standing Committee on Environment and Heritage, August 2005

15, states collect essentially all the indirect revenue related to fuel consumption and this forms a noticeable portion of their total income.

Figure 15

Indirect fuel taxation collected by states is significant



* 2001-02 figures extrapolated to 2005-06

** Victoria is Australia's 2nd most populous state

Source: RoadFacts 2005, Austroads; Victorian Government 2005-06 Budget paper 4

Within this context, three important options for modified state level indirect taxes and charges on fuel will be briefly examined: (1) efficiency related vehicle registration charges, (2) parking levies and (3) congestion charging in major cities.

1. Efficiency related vehicle registration charges

In most states such as Victoria, vehicle registration charges for private users are essentially flat rate; that is the registration charge is independent of the size, age or fuel efficiency of the vehicle. In these systems, the registration charge offers no incentive for reducing fuel consumption. More sophisticated systems, however, are gradually being implemented around the world with European regimes moving towards a system where the environmental impact of vehicle use is reflected in the registration charge with Austria,

Germany, Norway and Denmark already having differentiated registration systems.[50] The German system, for example, charges a registration fee based on cylinder capacity, engine power, and emissions rates with higher fuel consumption and pollution vehicles being charged a higher rate.[51] Such systems offer the consumer a clear incentive to purchase a more fuel efficient vehicle and serve as an annual reminder to the user of the fuel efficiency of their current vehicle.

Differentiated registration fess are clearly a positive step to help reduce fuel consumption and it appears that they are gradually being adopted by Australian states independent of federal government intervention. New South Wales (NSW) the most populous Australian state has already implemented a differentiated registration system for private vehicles based on vehicle weight with 4 weight categories, the highest of which pays an 80% premium over the lightest.[52] Victoria, the second most populous state currently has a flat rate structure as mentioned above but a recent government report has at least raised it as a possibility.[53] Given the example of NSW and the interest of Victoria, it seems reasonable to expect that other states will also gradually explore and adopt such systems of their own volition. Given this existing momentum, differentiated vehicle registration charges is probably not a concept that the Australian federal government should spend political capital on promoting to the states.

2. Parking levies

Parking levies are a similar case to differentiated registration charges in that they make good sense from a fuel consumption reduction perspective but are already being pursued by state governments.

---

[50] 'Managing Victoria's air quality', Victorian Government, June 2002
[51] Menz, Fredric C., 'Mobile source pollution control in the United States and China', Center for International Climate and Environmental Research, April 2002
[52] Road Traffic Authority of NSW, http://www.rta.nsw.gov.au/registration/registrationfees/index.html
[53] 'Managing Victoria's air quality', Victorian Government, June 2002

Parking levies refers to taxes on car park spaces in central congested areas that significantly raise the cost of using a private vehicle to access and park in that area. In this way, parking levies are an indirect form of congestion charging but exclude transit traffic and (normally) short term parking. Parking levies are targeted particularly at commuters who it is hoped will be induced to shift from private vehicle use to public transport and thereby reduce congestion, pollution and fuel consumption.

Sydney implemented such a parking levy in 1996 at AUD200 per space per year and has ratcheted it up to be AUD860 today. Perth, a much smaller city introduced a AUD180 charge in 1999 and the Victorian government has in 2006 implemented a similar scheme in Melbourne with the fee initially set at AUD400 and set to double next year to AUD800.[54] These charges and their historic and scheduled increases are evidence of a growing acceptance at the state level of parking charges as a useful technique for limiting private vehicle use and so in a similar way to differentiated registration charges, it is not appropriate for the federal government to expend political capital through tied funding to promote this type of tax further to the states.

3. Congestion charging

Congestion charging, in contrast to differentiated registration and parking levies, is a concept that has no momentum at the state level but is also a valuable technique for reducing fuel consumption and so warrants promotion by the federal government.

Private vehicle use in situations of near capacity loading of the road network is a classic case of negative, uncorrected externalities where the marginal driver imposes costs on all road network users in the form of increased congestion that are not reflected fully in his/her own

[54] 'Tax slug to fight city gridlock', The Age, April 23 2005

cost/benefit tradeoff. Such externalities in a recent Victorian government report on the potential of congestion pricing were cited to include the following:

Negative externalities caused by congestion (reproduced [55])
travel delays to passengers and freight
higher operating costs for motor vehicles and some public transport services
reduced productivity due to increased transport costs
increased driver stress
losses in urban amenity
increased vehicle emissions (noise and greenhouse gases)
reduced speed and reliability of tram and bus services
passenger discomfort due to over-crowding on train and tram services

The quantification of the deadweight loss associated with not pricing these externalities is difficult to measure and there is no consensus on what the figure is however most studies of major Australian cities indicate a cost per city of a least several billion dollars per year.[56]

The economist's solution to this formidable list of externalities is to impose a user charge that attempts to internalize these costs and therefore reduce demand in congested areas. Such a reduction in demand would of course also reduce fuel consumption as is relevant for this discussion.

The high profile success of London in implementing a £5 congestion cordon pricing system in 2003 (which later increased to £8) has revived interest in this type of charge that was long considered economically attractive but not politically possible except for in authoritarian or anomalous political systems such as Singapore or Norway.

[55] 'Making the right choices: Options for managing transport Congestion – draft', Victorian Competition and Efficiency Commission, April 2006
[56] Ibid

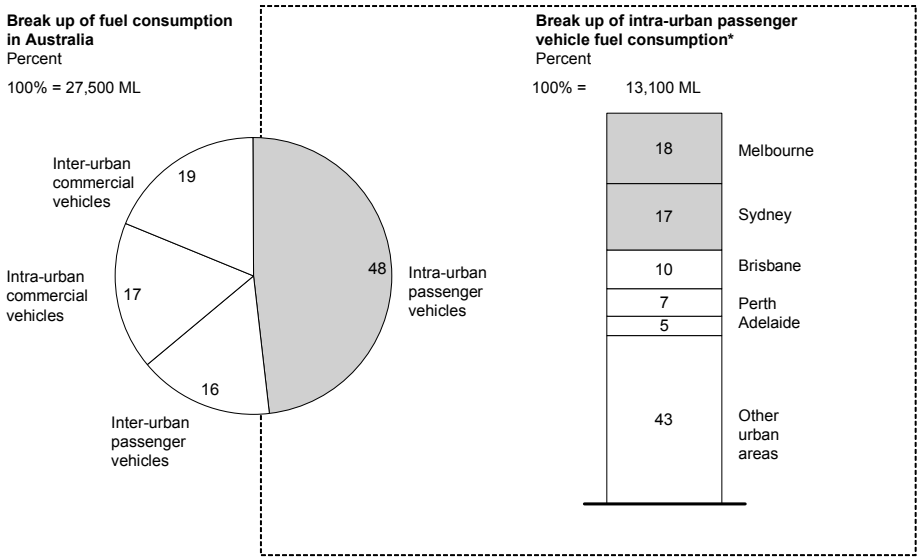
Melbourne and Sydney are Australia's two biggest and most congested cities by far and so are the obvious candidates for congestion pricing in Australia. The benefits of congestion pricing in either of these cities could be significant; London recorded a 20% drop in private vehicle use in the center[57] and modeling of potential congestion schemes in Athens and Lyon indicate forecast drops in demand of around 14%.[58] The political and demand reducing success of London was due at least in part to very clear earmarking of collected tolls for public transport to support mode shifting which would also need to be an important element of any system introduced in Australia.

Attacking congestion at the center of two cities in Australia might not seem like it would capture enough car use to effect fuel consumption significantly but as shown by figure 16, fuel consumption in Australia is dominated by intra-urban private vehicle trips and trips within Melbourne and Sydney alone account for more than a third of this category. No figures are available on the share of Melbourne and Sydney's fuel consumption that occurs within the congested urban core that would probably be subject to an initial congestion pricing scheme, however it is worth noting that once a congestion scheme is established in the core of a city, it appears relatively easy to extend its coverage to larger areas as has occurred in London and Singapore. As such it is reasonable to expect that implementing even limited congestion pricing schemes in the centers of Melbourne and Sydney could have significant fuel consumption reduction benefits in the long term for Australia.

[57] Litman, Todd 'London Congestion Pricing, Implications for Other Cities' Victoria Transport Policy Institute, January 2006
[58] 'Saving Oil and Reducing CO2 Emissions in Transport- Options and Strategies', OECD/IEA 2001

Figure 16

Transport fuel consumption is dominated by intra-urban passenger vehicles in capital cities



* Based on kms traveled (ie assumes fuel efficiency is constant across urban areas for passenger vehicles)

Source: Australian Bureau of Statistics, Survey of Motor Vehicle Use 2004

Unfortunately, there appears to be little political will at the state level to implement congestion pricing systems. Both the government[59] and opposition[60] in Victoria have publicly denounced the idea of congestion charging in Melbourne despite a rare coalition of greens and business groups advocating the concept.[61] In Sydney, the Lord Mayor has championed the idea of a congestion charge but found no support from the state government or opposition and given that the mayor is powerless to implement such a charge herself it appears that Sydney too is nowhere near seriously considering a congestion charge system.[62]

Given this reluctance to consider congestion charging at the state level it appears that this is one area where the Australian federal government could usefully intervene to encourage implementation of a system that would both reduce national fuel consumption and significantly improve the efficiency and livability of Australia's biggest cities. The federal government could

[59] 'Inquiry to tackle road congestion', The Age, September 15, 2005
[60] 'Liberals, Nationals to consider coalition', The Age, April 10, 2006
[61] 'City needs congestion toll by 2021: report', The Age, March 27, 2005
[62] 'A congested solution for the cross city woes', Sydney Morning Herlad, 12 December 2005

theoretically tie state road funding to a timetable for implementing such schemes in Melbourne and Sydney but such an aggressive move would be politically dangerous and probably incite a counter-productive backlash from the states. A more realistic approach would be for the federal government to initially fund detailed studies on the impact of congestion schemes in Melbourne and Sydney and then offer to cover the cost of building the tolling infrastructure, perhaps even funding intermediate solutions such as High Occupancy Toll (HOT) lanes as a stepping stone to more comprehensive congestion charging. Through such an approach, the Australian federal government could make a significant contribution to Australia's two biggest cities whilst also achieving the national objective of reducing fuel consumption.

Recommendation: Remove federal taxation distortions and promote congestion charging in capital cities

To summarize, the federal government has an important ability to reduce Australian fuel consumption through indirect taxation and charges. Firstly, it should remove the existing distortions in the indirect taxes it levies itself, specifically by removing the preferential fringe benefits tax treatment of salary packaged motor vehicles and eliminating the tariff discount for SUVs. Secondly, the federal government should use targeted funding to encourage Melbourne and Sydney to adopt congestion pricing systems to both reduce fuel use and improve the cities more generally.

CONCLUSIONS

The Australian federal government faces an important challenge in reducing Australia's steadily growing consumption of gasoline and diesel to limit significant economic and environmental damage associated with that consumption. This paper has examined the potential responses in terms of taxation and charges that the Australian federal government could implement.

Taxation and charges, however, are only one class of policy to manage fuel consumption in Australia and clearly a comprehensive strategy would consider much more, including fuel efficiency standards, direct funding for alternative fuels and even land use policy. Nevertheless, taxation and charges are powerful tools that can be used to curb fuel consumption in Australia relatively quickly.

Considering the range of economic, political, environmental and social factors discussed, the recommended policy for the Australian federal government may be summarized as targeted pragmatism and boils down to 3 main recommendations

1. ***Price floor***: Introduce a flexible fuel excise that maintains an effective price floor at around USD64/barrel
2. ***Fix incentives in indirect federal tax***: Remove fuel consumption promoting incentives in the indirect fringe benefits tax and vehicle import tariffs levied by the federal government
3. ***Congestion charging***: Fund research into and ultimately pay for the construction of infrastructure for congestion charging in Melbourne and Sydney

Implementation challenges

As discussed in the paper, serious implementation challenges exist for each of the recommendations. For the price floor, gaining bipartisan support and taking legal measures to ensure its durability under falling oil prices will be essential as will be constructing a mechanism for offsetting tax cuts that are appropriately smoothed year to year and do not disadvantaged the outer-urban poor. For fixing the incentives in indirect federal taxation it will be important to provide a phased transition and appropriate compensation for primary producers to ensure change is politically acceptable and equitable. Finally, for congestion pricing, it will be necessary to proceed relatively slowly and limit the pressure being put on the states to avoid a backlash against a still largely novel concept.

With careful implementation as described above, the proposed federal government actions on taxes and charges could have a significant and lasting impact on Australia's diesel and gasoline consumption and would form a solid core of a comprehensive transportation energy strategy.

APPENDIX:

FIGURES FROM TEXT ENLARGED