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Grasping the Mind of a Shopaholic

Mehzabin Chhavniwala, Li Ean Gan, Racha Ghazali & Ghananathan Rajasingam

This paper attempts at studying the phenomenon of excessive indulgence in shopping. While the act of shopping might be considered a normal activity, being a shopaholic transgresses what can be understood as 'normal'. Our research begins by defining shopaholics and contrasts their behaviour with regular shoppers by studying differences in the utilities each type of consumer gains from the act of shopping. Opportunity costs of shopping between those two groups of shoppers are also discussed followed by a brief examination of how shopaholic behaviour might play in role in the practice of price discrimination by retailers. We end our paper with a discussion of the market failure caused by shopaholics, and some possible interventions by government.

Defining Shopaholics

Shopaholics are compulsive shoppers who derive a significant amount of utility from engaging in the act of shopping. This behaviour is a form of addiction because shopaholics have a compulsion to shop, they are unable to stop and are prone to continue even if it brings about adverse consequences such as debts, hoarding and failed relationships. According to Koob & Moal (2008), the motivation that changes regular consumption to addiction is the temporary happiness gained as a result of certain hormones produced. Becker & Murphy (1988) also showed increased possibilities for addiction when rise in past consumptions has a positive correlation with current consumption. At the same time, they conclude that addictions also involve interaction between an addict and the goods. Regular shoppers will transform into shopaholics when they derive additional utility from the momentary lift in their mood and then become compelled to replicate that feeling in the longer term.

Motivation

Utility is the benefit or fulfilment that a person receives from consuming goods or services. The assumption in consumer theory is that rational consumers seek to seek to maximise their utility and are constrained by scarcity of their resources.

We shall assume that regular shoppers derive utility from the consumption of the goods and services they desire but do not add to their utility by engaging in the act of shopping. Further, we assume that a shopper's opportunity cost relies on two variables – posted price and search cost. Since regular shoppers do not spend much time shopping, they are more likely to fail in identifying opportunities in market where the posted price of goods are relatively advantageous. Thus, although their search cost is lower since they seek to minimize these to begin with, they will end up paying a higher price. Since the utility they gain over time from shopping is strictly negative we can write their utility functions as:

$$U = (x_i, \phi)$$

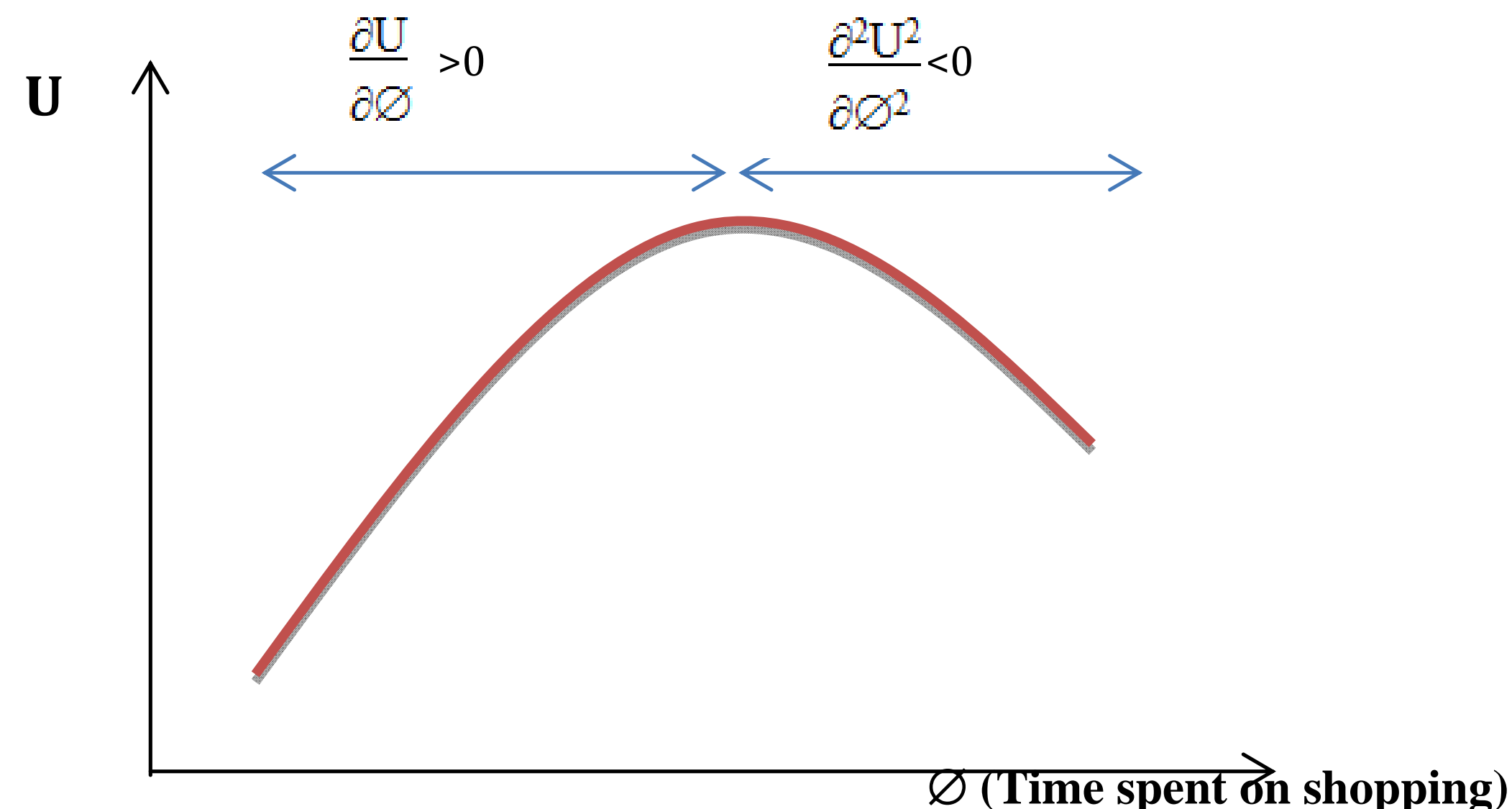
where the goods purchased as indexed by i , $x_i = (x_1, x_2, x_3 \dots, x_n)$ and search costs are $= \phi$ with $\frac{\delta U}{\delta \phi} < 0$

Orphanides and Zervos (1998) argues that as addicts indulge more in their addictions, the rate of time preference will increase because they recognise the utility induced by previous consumptions. Over time the increase in cravings for goods enhances their desire to retain present utility and weakens their consideration of perceived future consequences. Therefore, as opposed to regular shoppers, shopaholics would not mind spending a significant time shopping as the search activity by itself features as any other good in the utility function. Hence, in the short run, utility gained over additional time spent on any shopping is positive; thereby, facing an upward sloping utility curve.

Nevertheless, in the long run, the frequently needed euphoria leads to a negative utility because of the uncontrolled increase in the time spent on shopping. This is likely because search still entails an opportunity cost for shopaholics and consequences such as debts and reduction in work productivity will eventually have a toll on them. This leads to an eventual reduction in their

marginal utility from every extra unit of time spent on shopping. There will be a threshold of satisfaction where the shopaholics will start to refrain themselves.

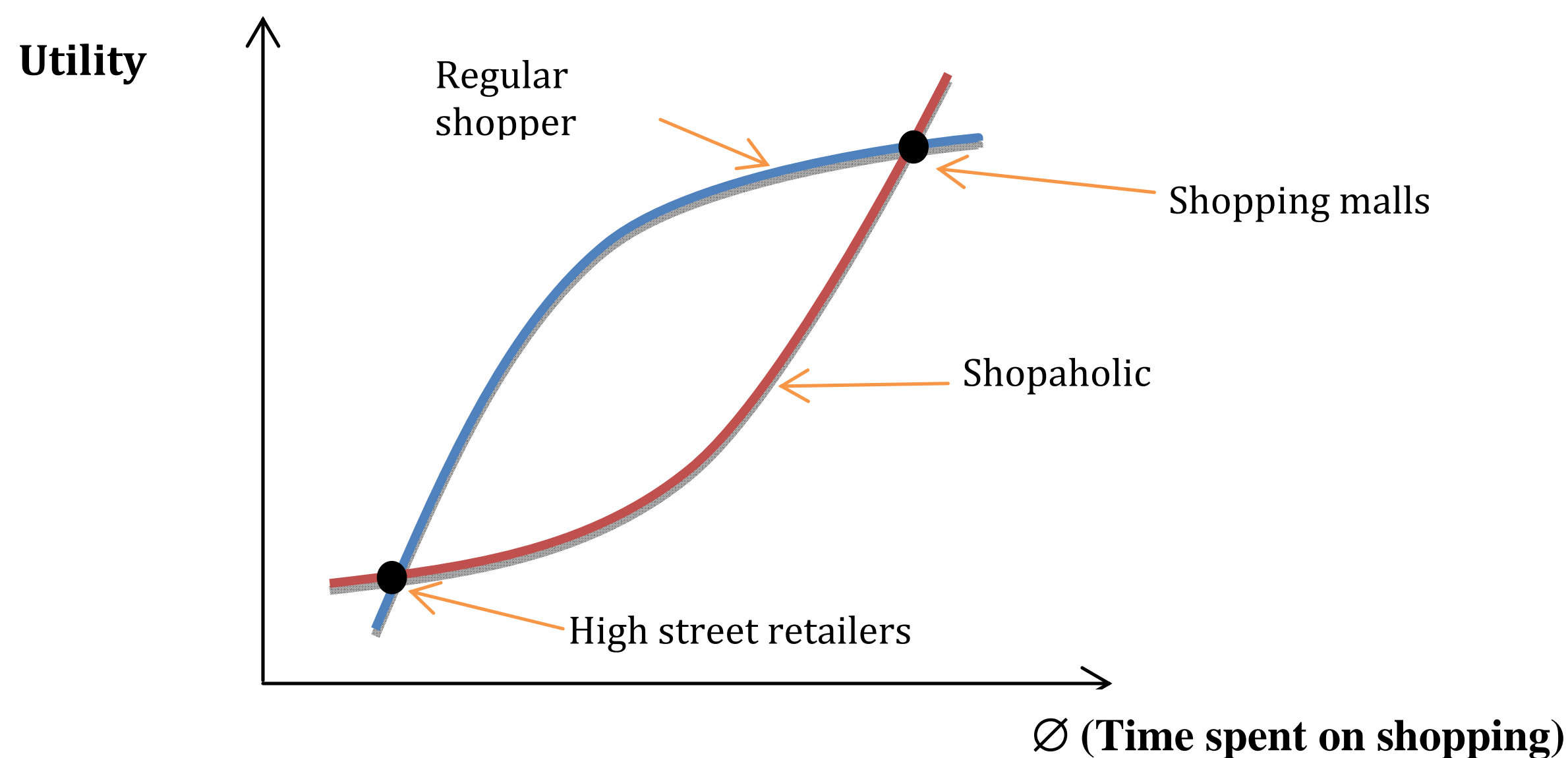
The utility curve for shopaholic can therefore be depicted with the following diagram:



The behaviour of shopaholics can perhaps be better explained using the concept of hyperbolic discounting. Gruber and Koszegi (2001) reason that although addicts look forward to continuing their addictions; some of them are incapable to actualise their desired future. While shopaholics are rational and may acknowledge that excessive shopping may lead them to adverse consequences, they discount their future hyperbolically and justify their current act of shopping by assuring themselves, perhaps by convincing themselves of the short term benefits; they are susceptible to making time-inconsistent choices. Gruber and Koszegi (2001) emphasize that rational agents that discount hyperbolically show strong tendencies to make choices that are inconsistent over time. It is therefore likely that an addiction such as this would continue until behavioural interventions are made.

Supply

The supply of goods to satisfy a shopaholic's addiction arguably comes from retail outlets that present shopping opportunities. These retail outlets are monopolistically competitive because they offer similar yet differentiated products and compete using a strategy of price discrimination by determining the price elasticities of their consumers.



Regular consumers incur lower search cost because they are inclined to minimize the time they spend at a mall in order to shop for desired goods. Search costs will, however, not be zero because in order to buy anything consumers still need to look for them. This suggests that their utility is concave in search costs. Shopaholics, as opposed to regular shoppers, are willing to withstand all the troubles of filling the member application form, linger in the outlet to enjoy chats with salespersons or collect stamps via re-purchase coupons; just because they derive utility out of the act of shopping, regardless of whether they would buy or not. Thus, search cost for them are higher, creating a convex line. The initial sharp increase was because they are unfamiliar with the goods which results to more search activities. As shopping time increases, they derive lesser utility from it and hence search cost would eventually increase only at a decreasing rate.

The interaction between these two groups of shoppers creates a separating equilibrium. At the points where both lines intervene, they provide opportunities for retailers to practice third degree of price discrimination (Lavoie & Liu 2007). When search cost and time spent on shopping is low, high street retailers have the upper hand. Reason is because; they are capable of differentiating consumer classes and understand that shoppers that choose to shop at their place are either rich or would not like to spend too much time on shopping. Hence, they can raise their price of goods and provide premium services to quickly service the customers thereby maximising shoppers' utility. On the other point, when search cost and time spent on shopping is high, retailers in malls would ace. These retailers know that shoppers are walking around for comparison; therefore, schemes such as seasonal sales, re-purchase discounts, member loyalty card or post-purchase services will attract and retain shoppers. Competitions in malls are also higher than high street retailers indicating the need for retailers in mall to be creative in their outlet's outlook that leads to thousands of dollars being spent on colourful posters and perfectly dressed mannequins. This is not only to stimulate curiosity on shoppers but also to arouse a sense of longing.

Market Failure

The behaviour of shopaholics poses both positive and negative externalities. A significant positive externality might be that their behaviour could increase the quality of retailers' marketing activities in terms of retail presentation and customer service. In addition, it is possible that their preference for search activity ensures goods sold at retail outlets are not overpriced or misinformed.

There are some significant negative externalities resulting from shopaholics' activities as well. Retail owners may be investing heavily on unnecessary marketing expenditures rather than on the intrinsic quality of products, which could not only reduce overall market efficiency, but may also be driving away the pool of regular shoppers. In addition, family members of shopaholics' might be negatively affected by their behaviour too. Broken family bonds as well as relationship failures are common consequences that shopaholics with tighter budget constraints usually face.

Apart from these issues, shopaholics are arguably more likely to be imposing a negative externality on the health of financial markets. They exacerbate the demand for easy credit and may be distorting the terms on which credit cards and store cards might be issued. Bankers may realize

that shopaholics might abstain from shopping if the availability of credit cards is tightly regulated and may, therefore, resort to two-way pricing strategies. Since the profitability of a credit card issuer relies on two variables - the cost of card purchase (P_c) and interest on repayments (i_p) - if an issuer chooses to lower (P_c), they can always manipulate (i_p) to maintain revenue. The increase in the interest rate may be seen a negative externality on regular shoppers.

Government intervention to ameliorate the social-welfare effects of shopaholics is minimal. At most, governments could intervene through motivational campaigns to educate its civilians on budgeted spending. They might also regulate the financial industry more heavily in forcing them to increase their standards on the availability of credit. Nevertheless, governments face dual incentives in doing so. While a government may conduct programs to eradicate bankruptcy occurrence among shoppers, they also seek economic growth which is assisted by shopaholics.

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Did China's Foreign Exchange Policy Hinder the US Recovery from the Global Financial Crisis?

Abhishek Kumar, Wui-Ken Liow, Joanna Moss, Yuan Sun, Zhong Yi Wang & Xi Zhuang

"...substantially undervalued..."

- Tim Geithner, US Treasury, January 2011

"...China manipulates its currency..."

- Charles Schumer (D), February 2011

"...huge competitive disadvantage..."

- President Obama, February 2010

The quotes above convey the perception that China's foreign exchange policy has had a harmful impact on the US economy. This paper examines whether China's foreign exchange policy harmed the US economy with particular reference to its GDP and unemployment levels since the onset of the GFC. We find, contrary to the commonly held belief, that China's foreign exchange policy has in fact helped the US recover from the GFC, albeit at the cost of strategic dependency on Chinese demand for its government debt.

Background to China's Foreign Exchange Policy

Like many developing nations, China maintains a managed, or pegged, currency exchange rate. Developing nations do so for several reasons including providing stability for trade and investment, allowing domestic infant industries to develop critical mass, and to acquire hard currency in its foreign reserves in preparation to enter a market-based arrangement

at a later stage. China maintains a *de facto* crawling peg against the USD allowing its value to fluctuate within a very narrow band predetermined by the People's Bank of China.

Between 1994 and 2005, the exchange rate was fixed at close to 8.28 Yuan per USD. Reforms to the arrangements led the exchange rate to appreciate from 21 July 2005 until the process was halted in the midst of the GFC on 21 July 2008 when the exchange rate was held at close to 6.83 Yuan to the USD. From 19 June 2010, after the worst acute effects of the GFC had passed, the appreciation of the Yuan commenced once again.

What is relevant to this paper is the exchange rate is set at a level which results in a large bilateral trade deficit to the US with China. Furthermore, as China's currency peg is maintained through the use of a closed capital account, China's State Administration of Foreign Exchange acquires large volumes of foreign assets to balance capital flows. These are largely held in the form of US Treasury Bonds and GSE securities.

Direct Influence of Chinese Demand for US Debt Assets

China's policy to acquire high grade US debt can be considered as an exogenous upward shock to demand for these assets. As Borio & Disyatat (2011) state, there need not be a direct, bilateral, financing link between countries that have trade imbalances although such imbalances must clear on a global basis. Nor does it follow that official reserves need necessarily be held in government issued debt or in the debt of government sponsored entities. Alternative reserve investment policy choices could readily have led to large portfolio investment in other assets like equities or gold. Morrison (2011) notes that US policymakers are openly concerned about a change in China's policy stance with respect to US debt instruments. This led to the introduction of bills in the 111th Congress to increase transparency of foreign government holdings of US debt and better assess exposure to such risks. Consequently, we consider it a policy choice for the managers of China's foreign reserves to invest heavily in US Treasury and GSE debt.

As the supply curve for debt assets is presumed to be unchanged due to this policy, and neither curve is perfectly elastic or inelastic in practice, standard supply-demand analysis suggests that the price of bonds and quantities issued will rise in equilibrium as a result of an upward shift of the demand curve.

As at 28 February 2011, China held approximately USD 1.2 trillion worth of US Treasury Bonds. This equates to approximately 12% of the total issuance of the bonds in public hands (source: CBO, author calculations). China was the largest foreign holder of these bonds (source: US Treasury). Additionally, China is estimated to hold approximately USD 500 billion of Government Sponsored Entity debt.

Gagnon, Raskin, Remache and Sack (2010) estimated the effect of the first of the more recent US efforts to monetise debt, which formed part of a USD 1.725 trillion expansion of the Fed balance sheet, was to reduce the yield on US 10 year bonds by between 38 and 82 basis points. As a result, China's foreign exchange policies, which resulted in large purchases of US government debt, have probably placed downward pressure on the yield for US debt securities and therefore produced an improvement on the terms under which the US Government was able to finance significant fiscal deficits in 2009 and 2010.

The Impact on Trade

The US is a capital rich economy with relatively high average wages. In contrast, China is a country in which capital is relatively scarce and wages are materially lower in comparison to its industrialised trade partners. As an indication of this, GNI per capita for China was USD 3,650 in 2009 (source: World Bank). The corresponding figure for the US was USD 46,360. While some commentators (for example, *The Economist*) highlight that Chinese wages and unit labour costs have accelerated since June 2009, low labour costs appear to remain an area of comparative advantage for China which continued to enjoy a substantial

surplus of USD 15.8bn through 2010 in traded goods (source: China National Bureau of Statistics).

The Heckscher-Ohlin theorem suggests that trade patterns should reflect relative factor endowments. China has a relative abundance in labour and the US has substantive capital assets in place. The broad predictions of the model appear to hold empirically with China's main exports to the US being labour intensive goods like consumer electronics and apparel. In contrast, the US exports mainly capital goods like civilian aircraft and also other elaborately transformed manufactures (source: Bureau of Economic Analysis).

One important outcome is that the US imports disinflation from this trading partner. The rate of inflation on Chinese imported goods was 0.9% per annum for the two years to March 2011. This was materially below the figure of 3.4% for total imports, excluding fuels. This compares to the growth in the CPI experienced over the same period of 2.5% per annum or, excluding food and energy, 1.1% (Source: Department of Labour).

By helping to keep inflation well anchored and within acceptable US monetary policy target bounds, China's policies provided flexibility to Fed officials as they pursued unconventional measures to stimulate the economy. However, significant wage escalation in China during 2011, impacting the cost of exports to the US, may disrupt this accommodation if not contained.

Having established that China's policies have contributed to lower inflation and interest rates in the US, we consider how these influences affected aggregate demand and employment.

The Taylor Rule and GDP

The Taylor Rule, used as a guide to monetary policy settings for central banks, provides a credible and useful rule of thumb linking recommended interest rates, inflation and GDP. Although there are several versions of the Taylor Rule, one of the simplest provides adequate insight for our purposes. It states:

$$\text{Change in Interest Rate} = 0.5 \times (\text{Actual Inflation Rate} - \text{Target Inflation Rate}) + 0.5 \times (\text{GDP Growth} - \text{Trend Measure of GDP Growth})$$

The rule recommends easing monetary policy if inflation and output are below targeted levels. As previously discussed, China's policies place downward pressure on interest rates and actual inflation experience. It follows then, that China's policies provided an impetus and opportunity to close the output gap which had ballooned after the GFC.

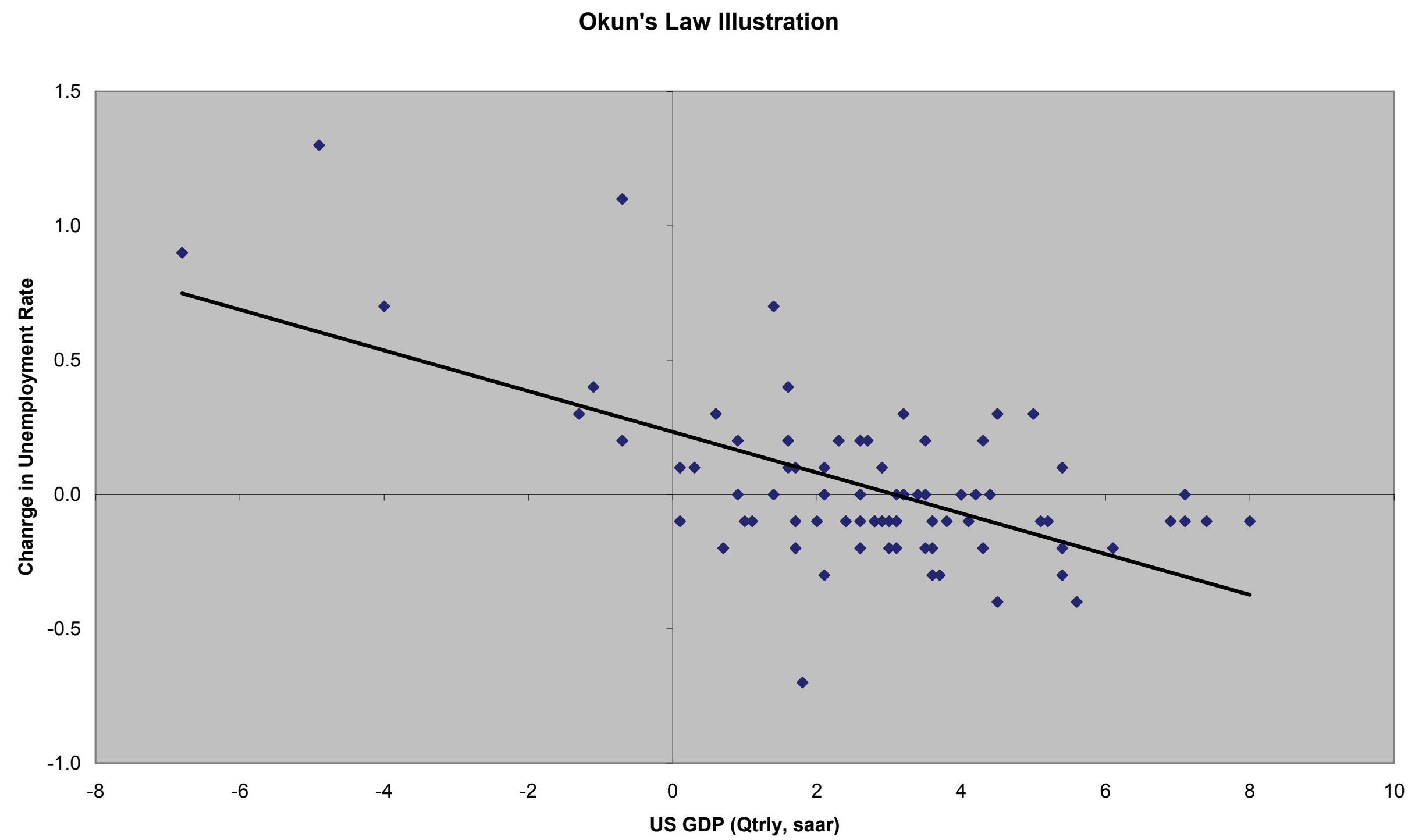
In addition, it is noteworthy that the Fed Funds rate had fallen below 0.25% by April 2008. The Fed had expanded its traditional open market operations to include acquiring GSE securities and mortgage backed securities by November 2008. These were further expanded from March 2009.

The Fed's quantitative easing program was undertaken to stimulate domestic capital formation and consumption, both of which boost GDP. As China's purchases of similar securities are a feature of their foreign exchange policy, their actions arguably contributed to improving US GDP.

Okun's Law, GDP and Unemployment

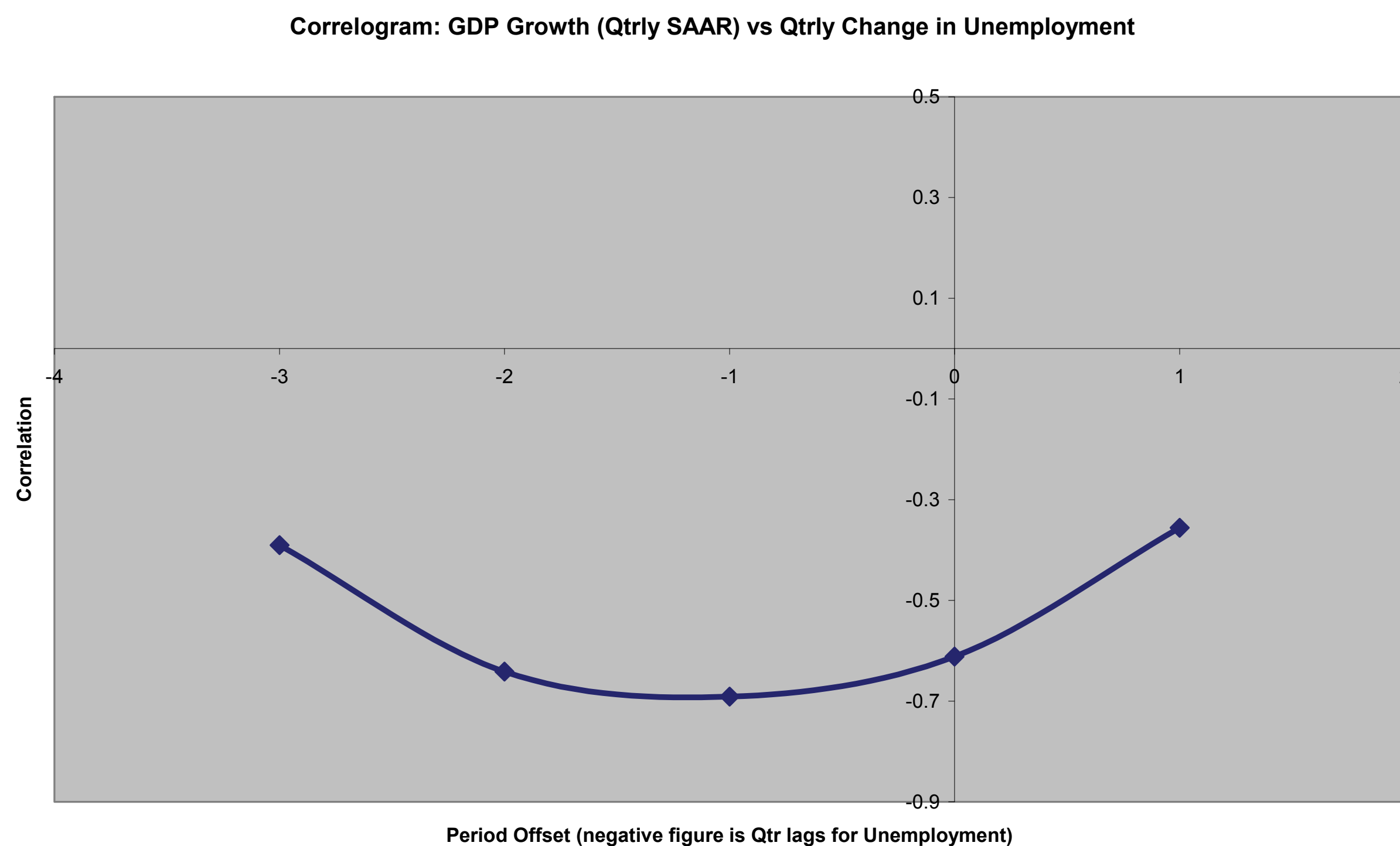
Okun's Law is an empirical observation that links GDP with changes in unemployment rates via an inverse relationship.

In the following chart, we show the inverse relationship between GDP and variation in unemployment rates in the US; both are seasonally adjusted.



Source: FactSet, BEA, June 1991 to March 2011

We examined the correlation between the changes in GDP and unemployment with different lags between the two. The analysis highlights that causality appears to flow from GDP to change in unemployment:



Source: FactSet, BEA, June 1991 to March 2011

By combining Okun's Law with the likely direction of causality, it appears that China's policies have also assisted with limiting the level of unemployment experienced in the US after the GFC.

Potential Adverse Consequences of China's Foreign Exchange Policies for the US

China's policies have left the US exposed to the possibility that a shift in targeted reserve composition could result in an adverse outcome. Reserve composition might alter following a change in the exchange rate regime itself or, more narrowly, via a change in China's reserve portfolio investment strategy.

Continued confidence in the performance of the US with respect to the ability and preparedness to honour its debt obligation is of vital importance to sustain the economic

recovery efforts. Any sign from China that it has lost confidence in its holdings will be closely scrutinised. With the US Federal Government reporting annual fiscal deficits approximating 10% of GDP in recent years and an estimated government debt position of 69.4% of GDP in 2011 (source: CBO, debt held in public hands), China has substantive ability to inflict harm on the US economy if it chose to, albeit not without cost to its own economic structure.

The US is vulnerable to China's ongoing appetite for US Treasury securities for its economic recovery. Nevertheless, in seeking to recover from the GFC, this support has been invaluable to the US and arguably to the entire set Western economies.

Some economists and policy makers believe that global trade and current account imbalances arising from China's policies contributed to the GFC. For example, Obstfeld and Rogoff (2009) found relationships between housing price changes and deterioration in current account balances for industrialised countries in the period preceding the GFC, providing grounds for supporting such beliefs.

Nonetheless, in the immediate period following the GFC, US monetary policy was targeted at containing a collapse in aggregate demand and towards taking steps to ensure that the supply of credit was not suddenly withdrawn. To that end, China's policies were instrumental in supporting the efforts of the US Federal Reserve and US Treasury.

From China's perspective, the policy makers face extraordinary challenges with managing the economic emergence of its populace. With the knowledge that "sudden stops" and runaway inflation have interrupted the economic prosperity of many emerging economies, it judges that sterilisation of flows and a managed currency via closed capital account are appropriate policy tools for the current stage of development.

The interventions cause certain imbalances in the economy, possibly producing a "savings glut" (Bernanke 2005). This reduces the cost of debt and a related search for yield phenomenon can create perverse incentives, leading to dislocations like the housing bubble. As such, China is often accused of contributing to the GFC itself.

Concluding Thoughts

In the period following the GFC, China's demand for US issued Treasury bonds and ability to export disinflation to US consumers appears to have assisted a recovery in GDP and helped to limit the level of unemployment. The demand for US Treasury Bonds was also crucial in financing fiscal stimulus programs in 2009 and 2010.

In the longer term, the US appears to have grounds to seek to limit the extent to which it is reliant and beholden to China as a financier from a strategic perspective and, possibly, due to empirical associations between global imbalances and subsequent financial system instability.

Chinese officials believe that the costs of adjustment associated with a rapid appreciation of the Yuan would be high and contribute to domestic instability with global consequences. Additionally, some analysts observe a risk that Chinese policy reform would remove a large buyer of US debt from the market and offer no clear replacement.

It seems appropriate that progress towards reforming the currency policy should be undertaken in measured way.

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An Economic Analysis of the Luxury Car Tax in Australia

Andrew McPherson, Sharon Guffogg, Sae Takemoto & Scott Williams

Introduction

Luxury cars are a symbol of wealth, success and prestige and are a commodity of a sophisticated monopolistically competitive market around the world. Considering luxury cars to be representative of superior goods, you would expect sales to be decreasing during an economic downturn. However, while sales of luxury cars in Europe and the US declined during the GFC, sales within Australia increased substantially.

This paper presents a closer inspection of this market in Australia and particularly focuses on how the government has applied the Luxury Car Tax (LCT). It looks at the impact of the LCT on the Australian luxury car market from an economic perspective, and attempts to explain the political rationale for maintaining such a tax.

About the Luxury Car Tax (LCT)

The LCT was first introduced in Australia in 2000, at the same time that the Goods and Services Tax (GST) replaced the wholesale sales tax. Currently the Australian Taxation Office (ATO) defines a “luxury” car as any vehicle which carries less than two tonnes, less than nine passengers and is a passenger car, station wagon or four-wheel drive vehicle with a GST-inclusive price (LCT value) above the LCT threshold of \$57,466 or \$75,375 for cars with a fuel economy of less than 7 litres per 100km. According to the ATO’s website the tax is calculated based on the LCT value of the car *less* the LCT threshold *less* the amount of GST above the threshold *less* the LCT rate or equivalently:

$$[(\text{Retail value including GST}) - (\text{LCT threshold value})] \times (10 / 11) \times (33 / 100)$$

The initial LCT rate was set at 25%, however, in July 2008, this rate was increased to 33% by the Rudd Government. At the time, Treasurer Swann advised that the ‘*Government believes that Australians who can afford luxury vehicles have the capacity to contribute to revenue at a higher rate than other car buyers.*’ (Increasing the Luxury car Tax, 2008). He also went on to forecast that the increased LCT rate would generate an additional \$555mn over 4 years (2008). Table 1 demonstrates the returns from the LCT over the past four periods. In other words, the tax incidence would fall upon the wealthy by reducing their collective surplus by such amounts.

Table 1: Actual luxury car tax collections (ATO Statistics)

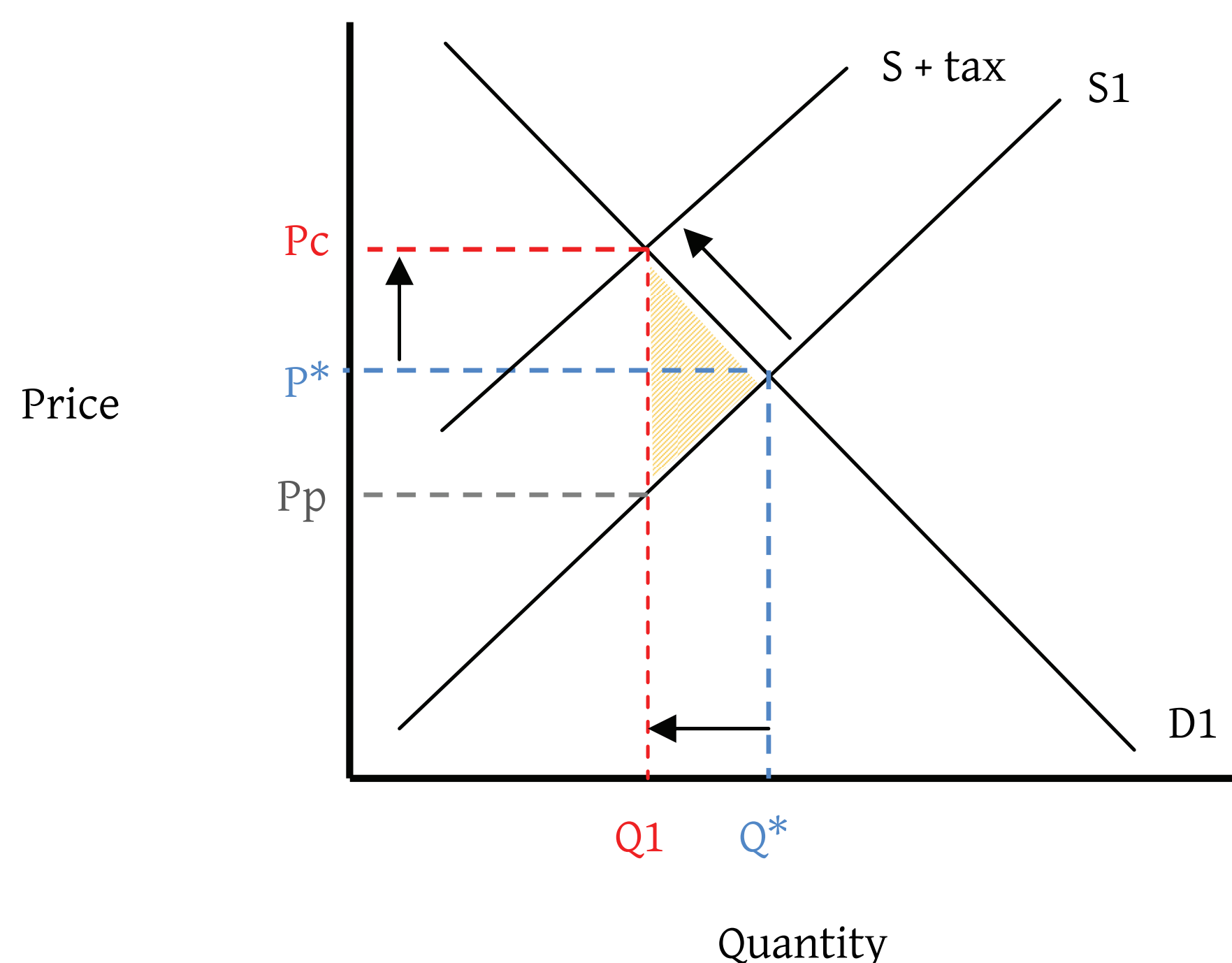
2005/6	2006/7	2007/8	2008/9	2009/10
\$321M	\$370M	\$447M	\$376M	\$482m

However, the LCT can be seen as a directly-unproductive profit-seeking activity (DUP). Bhagwati (1996) describes two groups within the DUP theory:

1. **Downstream** activities where lobbying income is derived from import quotas or tariff revenues (also known as rent seeking or revenue-seeking).
2. **Upstream** activities where lobbying income is derived from protectionism (or lack thereof) and affects the profits earned.

The LCT falls into the downstream category and can be seen as an exacerbating the deadweight cost in the market.

Graph 1: Supply/demand curve showing dead weight loss due to tax.



- The addition of the sales tax causes a shift in the supply curve ($S1$ to $S + tax$)
- This causes an increase in the price for consumers from P^* to Pc
- This then reduces the quantity demanded from Q^* to $Q1$
- This also results in the price received by the car producers to fall to Pp .

Economic Significance of the LCT

If we begin with the premise of neoclassical economics that a policy of unhindered free trade maximizes welfare and enables markets to achieve efficiency in equilibrium we can then understand the Australian Government's decision on the LCT as a political-economic two-level game. On one level by lowering the import tax from 10% to 5%, the government signalled to the international markets a positive step towards a freer trade policy. However, on the second level, the LCT is applied to a minority which is unlikely to be able to organise a coalition with enough effectiveness to oppose the tax successfully and thereby panders to the majority electorate. Furthermore, the LCT:

- would not be likely to draw retaliation from trading partners as it is applied to both the foreign and the domestic luxury car market;
- is a domestic policy that drives a wedge between market prices and social costs and
- is not an explicit trade barrier such as a duty or a quota would be

The first law of demand tells us that there is an inverse relationship between the price of a good and its demand, all things being equal (Graph 1). The LCT creates a dead weight loss due to inefficient underproduction (the area shaded on graph 1) where the distribution of the burden of the tax is increased for the consumer and decreased for the producer.

Government intervention in the luxury car market, via application of the LCT and associated threshold, also creates distortion in consumer choice in a number of ways. First, consumers that find themselves making choices at the threshold may opt for buying cheaper cars to avoid paying the LCT. This leads to a welfare loss in terms of consumer surplus. Second, the preferences of luxury car consumers may shift from standard specification models to higher specification ones in line with the third law of demand - when the price of two substitute goods increase by the same amount per unit including LCT, there will be a shift in demand towards the higher grade goods. Empirically, retailers do offer higher specification models in Australia relative to the rest of the world. This offsets the effect of LCT on price countering the impact of the tax negatively impacting luxury car sales.

Both of these effects will reduce producer surplus. Also, the higher 'fuel efficient' threshold may incentivise the purchasing of 'fuel efficient' cars. However, the definition of 'fuel efficient' vehicles via a simple fuel consumption limit is questionable in terms of its effectiveness from an environmental viewpoint and may well distort the incentives on pursuing other forms of innovations. Furthermore, the car accessories market is distorted in favour of 'after market' suppliers in the case of luxury cars, because LCT is applied to accessories when included at the time of car purchase, whereas it does not apply when purchased after the vehicle is bought.

Political Economy

Under Bhagwati's (1996) *clearinghouse government* model of introducing the government in economic constructs, economic agents such as lobby groups compete with each other to win more favourable policy outcomes. Table 2 shows possible lobbies in relation to this tax to understand the sources of discrepancy between economic theory and reality.

Table 2: Supporting and Opposing lobbies for the LCT

Supporting Lobbies

Competitors

- ✓ Manufacturers of non-luxury cars
- ✓ Alternative luxury goods vendors.

Lower-Income Groups

- ✓ People who cannot afford luxury cars – a larger coalition than that of those who can afford a luxury car.
- ✓ Based on *Ability-to -Pay Principle*: where the burden shifts towards the wealthy rather than the poor

Environmental Protectionists

- ✓ The LCT incentivises fuel efficient 'green' cars through a higher threshold.

Opposing lobbies

Luxury Car Manufactures and Consumers

- ✓ Brand loyal customers
- ✓ Regional 4WD consumers are subject to this tax even though these cars are a necessity and not a luxury item. (FCAI, 2008)

Environmental Protectionists

- ✓ Luxury cars have advantages in safety features as well as lower emissions and fuel-efficient technologies (FCAI 2008)

Free Trade Advocates

- ✓ LCT can be construed as a non-tariff barrier

The application of the LCT follows the Grossman-Helpmann (1994) model for endogenous protection and explains the curious relationship between increased taxes and increasing demand of high value vehicles. This model relates to a Ramsey tax structure that advocates minimizing the deadweight loss of taxation by taxing goods with the most inelastic

demand. It predicts that, for unorganized industries, the relationship between the number of imports and the level of trade protection is inverse as the industry cannot sustain trade protection and will have to compete with imports.

By extending the Grossman-Helpman model and assuming that the government considers tariff revenues as a separate policy priority in order to support budgetary performance and deliver the demands of a two-level game, the government is mostly concerned with budget income and tariff revenues followed by public welfare, with special interest lobbies being the lowest ranked. As a result the following predictions of the model are relevant:

By way of example, *The Australian Financial Review* (13th June 2011) recently reported a 178% increase in Australian Rolls Royce sales for the year. Despite the increased level of taxation and implied deadweight loss, Ramsay's pricing theory seems to hold.

LCT – Winners and losers

People engaged in ordinary economic activity are driven by self-interest. In the case of the LCT, this has created two distinct sets of market participants - those who have benefits from its operation and those who are worse off:

1. **Losers:** Special interest industry groups and lobbies who largely base their opposition on the price of luxury cars in Australia as compared to other countries. Refer to Table 3 for an example of this basis for opposition.

Table 3: Car price comparison

	Porsche 911	Rolls Royce - Phantom	Range Rover Sport V8	BMW M3	Lexus RX450h	Holden Commodore SS
Country of origin	Germany	England	England	Germany	Japan	Australia
Australia	\$ 293,000	\$1,068,000	\$ 160,000	\$ 168,000	\$ 97,000	\$ 45,000
Japan	\$ 134,000		\$ 125,000	\$ 110,000	\$ 62,000	
England	\$ 107,240	\$ 450,000	\$ 103,000	\$ 85,000	\$ 70,500	
USA	\$ 77,140	\$ 373,000	\$ 72,000	\$ 59,000	\$ 46,000	\$ 30,000

Figures in current AUD (Spinks 2011)

2. **Winners:** Those car manufacturers (predominantly from Asia and domestic) as well as consumer groups who have a self-interest in non-luxury car affordability, per Table 4. Note that the average wage has increased by 63% in the same period (James 2010).

Table 4: Affordability of Ford Falcon and BMW 320i

	Ford Falcon affordability	BMW 320i affordability
2006	36 weeks of wages	54 weeks of wages
2011	31 weeks of wages	43 weeks of wages
Improvement in affordability	16%	26%

The Henry Tax Review (2010) questioned whether the Government, via the LCT, actually achieves equity in terms of effective redistribution of income. It also queried the narrow, discriminatory nature of the tax, given that the LCT targets consumers who prefer expensive cars over most other luxury items.

The resulting distortion in the market creates economic inefficiency whereby social welfare is prevented from being maximised and creates deadweight loss. However, the section of society experiencing this inefficiency is the high-income group of luxury car buyers. While this sub-group would be considered relatively small, it is also quite diffuse, and therefore difficult to coordinate into a strong enough lobby to effectively oppose the LCT. This follows Olsonian Coalition Theory, where a group or coalition must have sufficient size and be concentrated (not diffuse), in order to organize successfully and become effective.

Nevertheless those who are passively (not vocally proactive) in favour of the LCT are also aware that it is discriminatory towards the growing minority of people able to purchase a luxury car. A 2010 survey on public attitudes to tax demonstrated that better than 80% of respondents believe that high income earners pay too little tax (Spinks 2011). Combine this sentiment with the comment by Wayne Swann (cited above) and the fact that most other luxury goods are not taxed outside of GST and it is clear that the LCT is highly and knowingly discriminatory.

One key supporting reason for the Government to maintain the LCT is that it has had little impact on luxury car sales. The LCT does act as a trade barrier as it taxes a higher proportion of imported cars than domestic cars. However, the argument that this has limited sales of imported and domestically made luxury cars loses credibility when recent luxury car sales as a proportion of total car sales in Australia, has shown substantial increases as reported by CommSec (James 2010).

Conditioning and cognitive dissonance of the Australian market assist in the acceptance of the LCT. Improving affordability has somewhat counteracted the additional cost of the LCT as the average income has increased, whereby the gross price of a benchmark vehicle

model has remained unchanged. Moreover, the winners from the LCT are more concerned about not having to contribute to the \$500 million per year that the LCT generates than the welfare of those who do.

Conclusion

The LCT created a deadweight loss as a tax is expected to do. The dynamic effect of affordability increasing as the tax rate remains fixed contributed to the situation whereby the expected reduction in demand did not happen. The tax is a significant contribution to the price of luxury cars, making them appreciably more expensive in Australia than countries such as the US, UK and Japan. However, market demand continues to increase.

The LCT was put in place to raise revenue by taxing those deemed to have a higher degree of disposable income. While the tax exists against economic theory and expert industry advice, this paper corroborates the fact that it adds significant revenue into government coffers while reducing the surplus of consumers whom can tolerate it.

Based on economic theory and the political economics surrounding the issue, it is clear that the LCT is primarily a redistributionary tax that takes from the supposed wealthy few and gives to the not-so-wealthy many, albeit in a very inefficient manner. While it is far from being the “Robin Hood” of taxes (take from the rich and give to the poor for the unambiguous good of society), it is accepted by a largely silent majority of Australians and opposed by a noisy few.

While the tax does function as a rudimentary revenue raising device its inefficiencies and the distortions it creates support a conclusion that it should be removed and replaced with a model which takes the recommendations of the Henry Tax Review (2010) into consideration.

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Behavioural Change & Exercise: How to stop people from quitting

Line Smith & Lisa Monge

Introduction

Physical activity plays a significant part in staying healthy. A healthier, more physically active lifestyle leads to a diminished chance of succumbing to a variety of diseases that endanger the lives of millions across the world. One of the most well-known of these diseases is obesity, discussed in the paper by Campisano and Stewart (2008). That paper suggests taxes and tariffs on trans, saturated fats and sugars to diminish the problem.

While obesity is truly an endemic problem, we begin our paper on the established premise that physical activity is critical in preventing such diseases. We believe that the question of how obesity can be avoided by adopting a physically active lifestyle is as important as the issue that motivates our paper – that of how to stop people from quitting.

The purpose of this report is to examine the reasons for why the rates for physical activity are so low and to provide a discussion of the possible initiatives that would prevent people from quitting once they have started exercising.

An Analysis of the Market Structure

The Suppliers

The market for structured exercise can be described as being monopolistically competitive market as there are numerous participants offering differentiated

products and consumers develop a degree of loyalty to the brand and features each provides. It is a dynamic market with new gyms regularly opening, new group fitness classes being initiated, personal training expanding, gym equipment constantly being developed and parks, paths and government-supported programs regularly being introduced. In addition, due to the greater value the general public places on being fit and healthy, the demand for fitness facilities and equipment is likely to increase (IBISWorld 2011). There is therefore room for innovative competition in this market.

The Consumers in Australia

When it comes to Australia's current exercise behaviours there are some very revealing statistics that deserve attention. While 10% of the Australian population have gym memberships only 10% of these people actually use them. In addition, 50% of new gym members 'drop out' of their gym programs in the first month (Australian Institute of Fitness 2011). Moreover, while it is now commonly realized that most adults should participate in a minimum of 30 minutes of moderate physical activity a minimum of five days per week only 28% of the population actually do so.

According to Goldhaber-Fiebert (2011), failure to exercise is not due to ignorance but stems from difficulties in translating initial motivation into sustained behavioural change. Studies also show that a key reason for not exercising is a lack of time. Other reasons are difficulties to commit, pain, no motivation, kids and family, a lack of knowledge or a lack of results (Australian Institute of Fitness 2011). We now analyse the factors within a framework of economic theory that considers how a consumer's preference for physical activity can be related to behavioural issues.

The Economic Theory of Behavioural Change

Three theories in particular offer particular insight for why commitments to exercise tend to be temporary. When asked, most of us claim that we want to be more active. The problem is converting current motivation into a permanent behavioural change that enables sustained outcomes. Our decision-making preferences change over time and setting a goal only to abandon it in the future is known as dynamic inconsistency (Goldhaber-Fiebert 2011). Hyperbolic discounting provides an explanation for this dynamic inconsistency by suggesting that consumers often discount future payoffs hyperbolically rather than exponentially. In other words they prefer rewards that arrive sooner rather than later. People discount the reward with a factor that increases with the length of the delay. This can justify the preference of even smaller rewards that accrue earlier in comparison with larger rewards that arrive later. (Ainslie & Monterosso 2002). Agents therefore seem to abandon their exercise habit as they prefer an immediate award such as a chocolate bar rather than an hour at the gym providing them with future benefits.

The theory of bounded rationality sheds further light on the issue. A consumer's choice is assumed to be rational in the pursuit of utility maximization. However, due to limited and unreliable information, limited time and the limited capacity of the human mind to evaluate and process available information, individuals are bound to make satisfying rather than optimizing choices in certain situations (Stutzer 2007). We therefore end up having to making suboptimal decisions that could contradict our best interests.

The health and fitness industry keeps growing as does its supply of new innovative exercise options to provide for different needs. Whether these options are taken advantage of by a consumer, however, may also depend on socioeconomic factors. These include education, occupation, level of income, family situation, and their quality of living in the community. Depending on the alternatives and encouragement the community provides, an individual's level of activity may be

influenced. The supply of choices available within the community and the individual's disposable income can restrict the exercise options available. When there are less desirable options, greater incentives are needed. Some individuals lack the education and knowledge, preventing them from quitting. This is due to an unawareness of the associated dangers of inactivity and a lack of confidence associated with inability to sustain habits. Occupation is also critical, influencing both time and income. In addition, having a family reduces the convenience of exercising and time with children may be seen as an opportunity cost leading to people breaking their exercise cycle. Motivation and effort can also depend on an individual's social circle. Being surrounded by inactive, less educated people might impart a negative externality on one's own behaviour.

Some individuals are nevertheless successful in making physical activity a habit. Whether individuals manage to form a habit or not depends on aspects such as opportunity cost, motivation and the cost of effort. The initial cost of effort associated with exercising is high, making individuals less likely to put in the effort. As the opportunity cost of exercise starts to increase, individuals are less likely to continue exercising due to their time and budget constraints. Interventions that might exacerbate the motivational factor may include personal training options, weight loss and positive image programs in the media and exercise tracking devices such as pulse watches and running monitors. On the other hand, the longer an individual maintains the effort and commitment to their exercise routine, the greater is the chance that behavioural change is going to be successful as they reap the benefits of exercise with increasing returns from effort (Garrouste & Iōannidēs 2001). This can also be associated with path dependency, where individuals confronted with a decision are more likely to make the same decision as they have made in the past (Garrouste & Iōannidēs 2001). Given that lethargy and physically active lifestyles are both path dependent, the conclusion must be that the switching

costs from one to the other are high and therefore motivational interventions are as important to one group as they are to the other.

Higher utility is associated with a healthier and more physically active lifestyle, making it the rational choice for agents. However, consumers are at great risk of abandoning this lifestyle as the rewards associated with the choice are delayed or of the opportunity costs are insurmountable. As immediate satisfaction is valued higher than future satisfaction, committing to an exercise plan has a high probability of failure, the reason being the likelihood of the human brain to make satisfying rather than optimizing decisions. What is of great importance is to get people to see the benefits of making the choice of doing something less desirable today that will benefit them and others in the future. As the individual manages to make the initial change and overcome socioeconomic factors including limited education and low disposable income, commitment is more likely to be a success due to increasing returns from effort and the formation of a habit. This is above all more likely to be the case if the local community has various options available.

Market Failure Analysis

The effects of choices made by individual consumers on external parties are of significance. Obesity and other consequences resulting from not being physically active impose negative externalities on society such as increased public health expenditures. This is a result of a market failure brought about as a consumer's pure self-interest is leading to inefficient results. Arguably opportunity cost contributes to market failure and therefore interventions that make exercising more convenient and reduce the opportunity cost, making individuals less likely to quit, thus ameliorating the market failure as well.

A significant amount of public and private resources are spent on medical care expenditures due to inactivity. As private and public health insurance firms and governments cover a large percentage of these expenses it could be said that the

population pays the bill instead of those who are not healthy as a result of inactivity due to inability of sticking to a habit. Obesity, as a result of lack of exercise, can also be contagious. If surrounding friends and family do not engage in physical activity or have recently given up, there are fewer incentives for certain individuals to keep exercising as well. Lack of mobility and energy may also have a negative impact on the economy, as individuals do not perform optimally and the economy loses productivity. In addition, those not engaging in enough exercise may end up having to claim on their health insurance more often, increasing premiums paid by healthy individuals who do exercise. Moreover, people who have previously experienced a failed attempt at changing to a more physically active lifestyle may have an even smaller chance of becoming healthy in the future due to path dependency. People that have experienced such disappointment and waste of effort are more likely to experience physiological frustration and develop problems such as eating disorders and depression.

Suggested Interventions for Increased Market Efficiency

Due to these negative externalities leading to market failure, an increased emphasis has been placed on various interventions to address the lack of physical activity. We would suggest a similar emphasis to also accompany maintaining a physically active and healthy lifestyle.

Zimmerman (2009) uses behavioural economics to suggest that social norms, habits or cultural frames are all factors influencing whether physical activity is fun or just hard work. Changing these anchor points may become useful in sustaining a positive attitude towards exercising. It has also been suggested that physical activity may increase if policy makers focus their attention on promoting family friendly exercise programs, due to the time pressure constraints parents are facing (Brown & Roberts 2010). The Australian Institute of Fitness (2011) also states the importance of an early promotion of physical activity to young children. They argue

that children need to learn fundamental skills and the ability to develop health related fitness, the argument being that the earlier you start forming people's habits, the more likely it is to become a natural part of their everyday life. Community-based physical activity interventions are proven to be a cost-effective way of promoting a more active lifestyle. These are interventions like improved access to facilities such as fitness centers, bike paths and walking trails. It is also important that town planners and governments stress the positive benefits of physical activity and help facilitate it (Brown & Roberts 2010).

A more controversial intervention would be to introduce an obesity tax on overweight people couple with a reward for those that maintains a healthy lifestyle. Taxes and tariffs are seen on unhealthy products such as trans, saturated fats and sugars to diminish the problem. Increasing costs or penalties therefore seem to be an effective way of keeping people from eating unhealthy.

In keeping with our argument in this paper we think another intervention that could be considered would be increasing future awards to make future goals more desirable than the present. One such solution might be a reward of X after 2 years and then another reward of $X*2$ after 3 years and so on. Verifiability of results could be easily accomplished using the existing records of consumers within the medical system.

A Concluding Thought

Rational agents chose a healthier lifestyle by incorporating exercising into their life as they seek maximum utility. However, as rewards are delayed many abandon this rational way of thinking. The low rates of exercise and how to stop people from quitting have therefore been examined in this report. To conclude, interventions to increase market efficiency have been studied to reduce the cost of negative externalities imposed on the market.

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The \$845,000 Porsche 918 Hybrid Spyder: Redefining the Supercar

Ismail Abdulhak & Trent Andrew Smith

Introduction

As a result of the role of the automobile in contributing to carbon emissions and in symbolizing the overconsumption of scarce non-renewable fuel resources coupled with the increased media focus on climate change governments all over the world are intervening in the automobile market with regulation.

Rising world oil prices and consumer preferences for environmentally friendly goods has driven automobile manufacturers to research, develop and market alternative drive systems. Such advancements are now common in the family car market with hybrid electric as well as fully electric cars now available. However, Porsche are blazing a new trail with their introduction of the new 918 hybrid Spyder. They plan to trigger acceptance for low emission hybrid drive systems in a market that has had few viable or perhaps even acceptable alternatives to the gasoline combustion engine – the supercar segment.

Our paper addresses how Porsche will manage the risk of introducing their unproven technology of a plug-in hybrid and a new type of liquid-cooled lithium ion battery that charges on any regular electric network. We show how Porsche rationally reduce this risk by first staging the technology within an inelastic consumer segment enabling a higher price by making their supercar relatively exclusive. We explore how, by utilising economies of scale and scope, Porsche may be able to reduce the average total cost of mass-producing their new technology in the future while maximising economic profit. Technology adoption requires first achieving a critical demand. If that demand is met the technology is

more likely to be successfully adopted. Porsche realize this effect. By deploying the technology within a smaller submarket with highly inelastic demand such critical demand level is far easier to meet than it would be in a large market with elastic demand. The car however needs to be special and thus we begin by examining some key characteristics of the Porsche 918 that address the problem of consumer acceptance.

The Porsche 918 Hybrid Spyder Supercar

Until now hybrid technologies have been unable to have any significant impact in the supercar market, the most notable exception being the sports cars developed by Tesla Motors which too have unable to draw recognition as genuine supercars.

After testing the market receptiveness of the 911 GT3 R Hybrid race car and the 918 RSR hybrid concept vehicle, Porsche plan to break these final barriers of acceptance for hybrid supercars by combining high performance and efficiency with the production of their limited edition 918 hybrid Spyder. Named after the model's production run of 918 units, its premium price is US\$845,000 and will be on the road by 2013.

In the United States cars are assessed on their carbon footprint against vehicles of similar size not power. The penalties imposed on Porsche's smaller vehicles are comparatively greater than those imposed on the relatively larger yet equally powerful vehicles of their counterparts. . Hybrid versions of the Cayenne S and Panamera 4S have reduced the carbon intensity of Porsche's overall fleet.

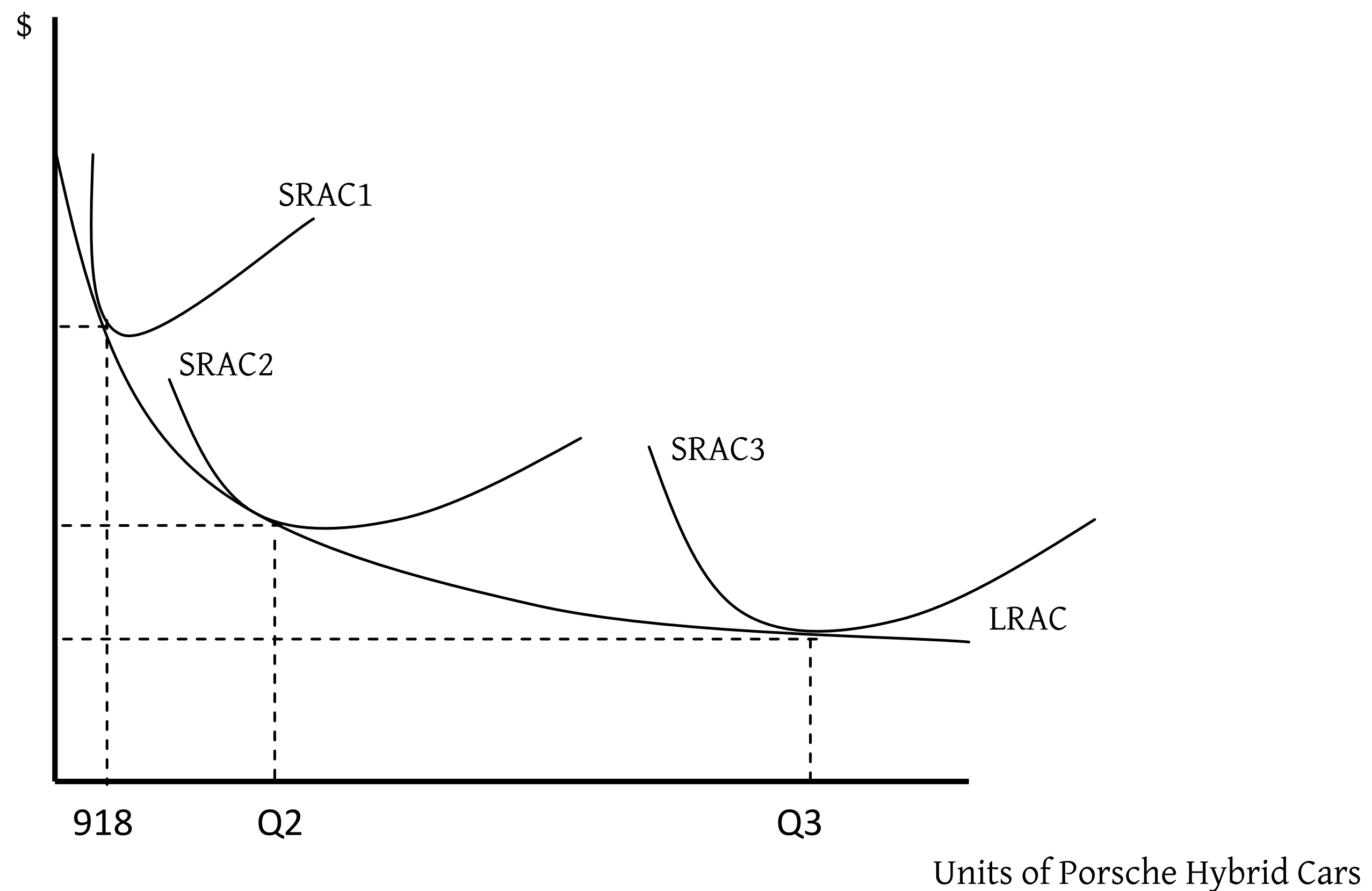
The role played by the 918 Spyder is to convince traditional Porsche 911 buyers to demand hybrid engines. The 918 Spyder is a plug in hybrid with a top speed of 320km/hour and an acceleration of 100km/hour in 3.1 seconds. Its estimated fuel consumption is a mere 3L/100km while CO₂ emissions are 70g/km. The plug-in recharge time is estimated at 7 hours in the USA with 110V/10A and its electric-only drive range is 16 miles

Porsche have a history of producing highly priced limited production vehicles capitalizing on significant brand value in the market. Brand loyalty amongst 911 owners is legendary and it is therefore no mistake that the 918 Spyder is visually similar to the earlier Porsche

Carrera GT supercar. It communicates to this group of aficionados that hybrid drive systems are the new engine of choice. We now explain how Porsche will manage the risk of introducing this unproven technology into the market.

Defraying the Cost of New Technology in the Short Run- Economies of Scale

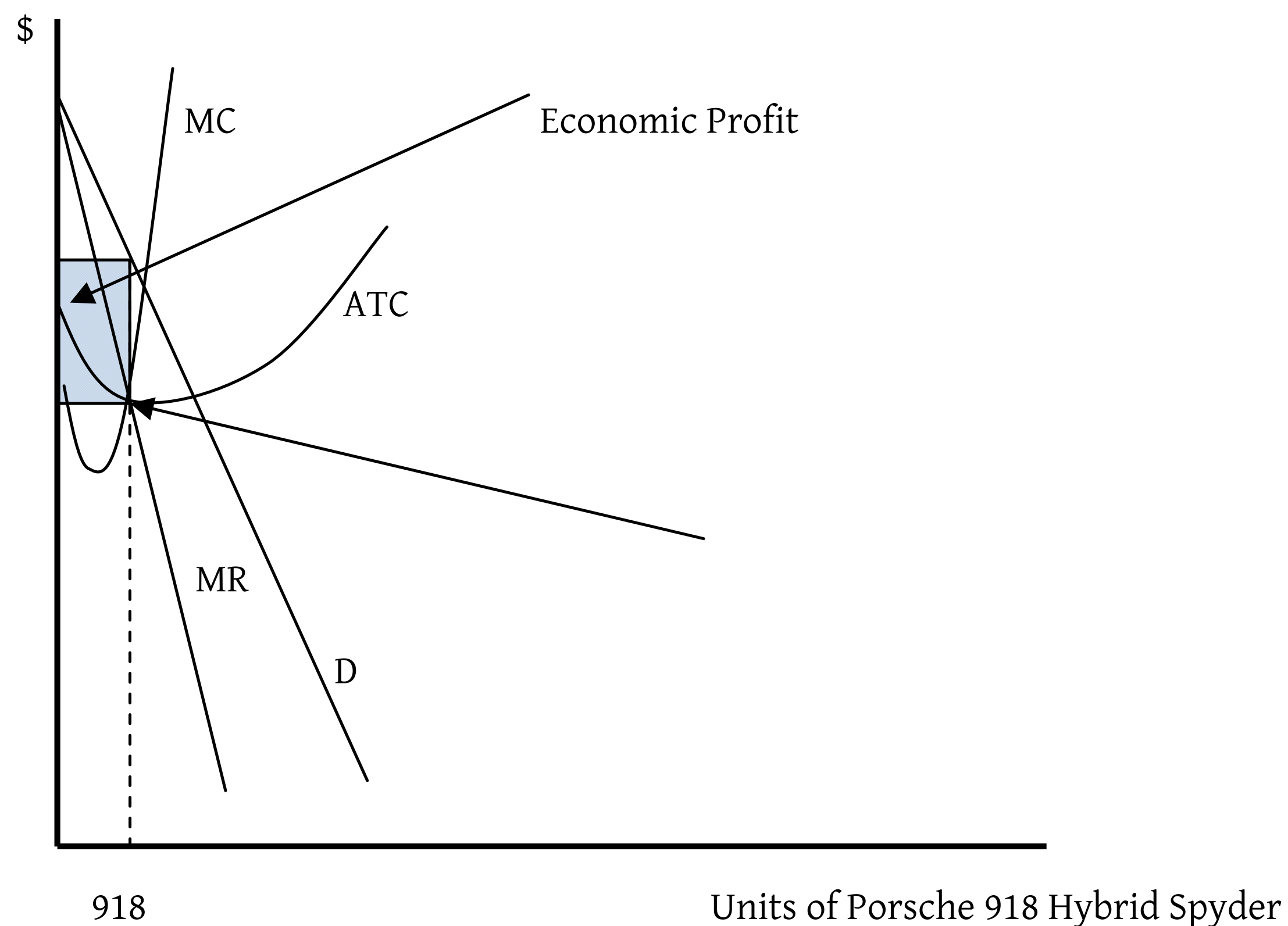
Figure 1- Path Dependency Cost Curve of Porsche's Hybrid Technology



The vehicle's new technology comes with prohibitive fixed upfront research and development (R&D) costs undertaken in two stages - development at Porsche's Weissach research facility and then assembly at its Zuffenhausen plant. The limited production run

of 918 units limits Porsche from capitalising on economies of scale. However future acceptance of hybrid engines by Porsche’s consumers would facilitate mass production allowing them to reduce average costs. Accounting for the high initial R&D costs, Figure 1 depicts a theoretical change in Porsche’s short-run Average Total Cost (ATC) curves from producing hybrid vehicles along with their long-run Average Total Cost.

Figure 2: Economic Profit from the 918 Hybrid Spyder



With higher initial production costs Porsche is operating in a world where the short-run average costs are likely to be high, as depicted by SRAC1 in Figure 1. It is no surprise

therefore that manufacturers are often unable to recover these high average costs expended on such novelty supercars. For example, Bugatti makes a loss on each Veyron they sell in spite of the million-dollar price tag it carries (Skentzos 2008). As a differentiated product enjoying a small market share and commanding powerful brand loyalty supercar manufacturers are in monopolistic competition. The 918's restricted production, premium price and small number of buyers has a relatively inelastic demand curve which can help offset the high initial start up costs of its new technology. This would likely allow Porsche to make a small economic profit whilst minimising the financial risks of manufacturing and marketing their hybrid supercar (Figure 2).

Packaging products with other products with higher profit margins allows firms a further avenue for recovering costs. In the case of the 918, for instance, buyers receive the option to purchase a 911 Turbo S "Edition 918 Spyder" (limited to 918 units) at retail price featuring the 918 Spyder's logos, along with other elements such as its instrument cluster needles and illuminated door entry guards. A badge on the glove box denotes their 918 Spyder order number. Porsche receive additional marginal revenue and economic profit at minimal marginal cost, further defraying the firm's development costs. Furthermore Porsche's policy for building the vehicle only when it is paid for in full by the consumer, is another strategy to reduce the company's exposure to risk in the occurrence of any internal or external shocks. Porsche's economic profit however is limited if they are unable to transfer the 918 Spyder's hybrid technology to their core 911 product. We will now show that Porsche could enjoy larger economic profit from its new technology through economies of scope.

Defraying the Cost of New Technology in the Long Run-Economies of Scope

Consumers faced with making a purchase decision on purchasing a sports car with imperfect information are likely to view all hybrid vehicles as an equivalent to the humble Toyota Prius. For Porsche 911 owners, the current cross-price elasticity for a choice

between a hybrid or gasoline combustion engine is likely very close to zero. Porsche aims to remove this asymmetrical information barrier of acceptance for hybrid vehicles by signalling to the market that the 918 Spyder is an equal substitute for any supercar in the market and that the opportunity cost of lost driving performance is negligible if any. Porsche are attempting to redefine the hybrid sports car by engaging in the Schumpeterian idea of creative destruction.

The rarity of the 918 Spyder suggests that it can be considered as a snob good with marginal utility increasing owing to its price and list of innovative features. The role of the model's groundbreaking fuel efficiency and performance backed by Porsche's image for reliability and fine engineering is to trigger the acceptance of hybrid engines in the sports car market. Once the hybrid vehicle becomes a genuine substitute for the gasoline combustion engine, Porsche will have raised the cross-price elasticity between the two choices.

The Second Law of Demand states that demand for a product becomes more elastic the longer the consumer is given to adjust to the market change. The 918 Spyder's economic profit will attract competition into the market. Ferrari's 599 Hy-Kers will be on sale and on the road in 2015, 2 years later than the 918. If the supercar market accepts hybrids and demand becomes more elastic, Porsche will be able to diversify this new technology to their core 911 product line along with their Cayman and Boxster range, consequently allowing the firm to capitalise on economies of scope. Capitalising on economies of scope will further reduce the firm's average costs and increase their economic profit. We now discuss how Porsche may maximise economic profit in their market through pricing.

Economic Profit Maximisation-Price Discrimination

Price discrimination occurs in monopolistic (imperfect) competition on the back of a degree of market power the firms possess demonstrated by a downward sloping demand

curve. The premium price and scarcity reinforces the Porsche 918 Spyder as a luxury good whereby demand for the good increases with income.

Porsche's approach to price discrimination for the 911 is widely acknowledged among automobile journalists. They price 911s closer to the maximum price consumers are willing to pay by simply creating a very large number of variants and by providing a dizzying array of options. The basic price of cars runs from US\$77,800 for a Carrera in the US to US\$245,000 for a GT2 RS. This allows greater producer surplus as Porsche's pricing is highest to groups with the most inelastic demand. Lower prices are charged to buyers of the more basic variants of its models where demand is more elastic, allowing profit maximisation in that case by increasing the quantity of units sold.

Additionally, the US\$845,000 price and limited model run reduces the risk of the 918 cannibalising global sales of the 911 model allowing Porsche to make additional economic profit. In the long run Porsche will maximise the firm's economic profit when it offers the choice of a hybrid engine for all its model ranges. The new technology of the Porsche 918 Spyder could trigger progression in the automobile market through consumer acceptance of the hybrid drive system as their engine of choice perhaps ultimately even replacing the gasoline combustion engine. We conclude by showing how Porsche's strategy today is one that is relevant to all firms operating in imperfect competition.

Conclusion

Firms face economic uncertainty, operating with a scarcity of resources and regulatory constraints. Porsche's technological response to the external forces of peak oil concern, shifting consumer mentalities and climate change could reduce the firms' carbon intensity addressing actual and implied government interventions.

Our paper shows Porsche's strategy in tackling the challenges of acceptance for hybrid drive systems has been that of internalising an externality into the firm's cost structure but increasing profitability by simultaneously engaging in creative destruction. We conclude that by using economies of scale and scope Porsche aim to minimise the marginal and thus

average total cost of the required new technology by introducing hybrid systems into their more inelastic product lines and once successful eventually transferring this technology to their less inelastic products. This is a profit maximisation strategy that is available to any firm in monopolistic competition.

Firms that practice creative destruction in their marketplace make prior products and technology obsolete. We believe Porsche have addressed the challenge of acceptance for a new engine of choice and may successfully usher in a new era for the sports car.

Epilogue

Lessons learned in Porsche's creation of the 918 Spyder supercar has led to the development of the Boxster E. Porsche revealed at the 2011 Michelin Challenge Bibendum in Berlin their rear and an all wheel drive Boxster E, electric prototypes that are now being trialled to establish the practicalities of daily commuting and recharging.

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