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How Windfall Income Increases Gambling at Poker Machines

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Abstract

In December 2008 and March-April 2009 the Australian Government used fiscal stimulus as a short-run economic stabilization tool for the first time since the 1990s. In May-June 2012, households received lump sum cheques as compensation for the introduction of the Carbon Tax scheduled for 1 July 2012. This paper examines the relationship between these financial windfalls and spending at electronic gaming machines (EGMs) using data from 62 local government areas in Victoria, Australia. The results show large increases in spending at EGMs during the periods when Australian households received economic stimulus cheques. Increased spending at EGMs in December 2008 amounted to 1% of the total stimulus for that period. We conclude that the 2008-2009 stimulus packages substantially increased gambling at EGMs in Victoria. We find no unexpected increase in spending at EGMs in the months when Carbon Tax compensation cheques were paid.

JEL classification: E21, E62, H3, H5, L83

Keywords: Gambling, stimulus, Australia, windfall income, electronic gaming

I. Introduction

As part of the response to the 2008 Great Recession (in Australia better known as the Global Financial Crisis or GFC) the Australian Government pump-primed the economy with two rounds of lump-sum, non-taxable stimulus cheques. The first round of stimulus cheques was announced on 14 October 2008 under the banner of the 'Economic Security Strategy' (ESS) and delivered approximately $8.8 billion to Australian households. The second round of stimulus cheques was announced on 3 February 2009 under the banner of the 'Nation Building and Jobs Plan' (NBP) and delivered an additional $12.2 billion to Australian households.[1]

By any standard these were very substantial transfers. The combined total of ESS and NBP payments amounted to nearly $1,000 for every person living in Australia. According to official estimates around 10.6 million families and singles received a payment under either the ESS or NBP (Swan, 2009). [2] By the end of the two rounds of stimulus cheques many families received several thousand dollars.

Conventional economic theory holds that expansionary fiscal policy facilitates short-run increases in consumption, thereby stimulating aggregate demand. From this perspective, any increase in consumption immediately following the stimulus cheques should have been anticipated. This is especially the case for normal goods and services with high elasticity of demand such as gambling (Suits, 1979). Yet it was only when the lump-sum compensation for the introduction of Australia's Carbon Tax[3] was paid to low-income households (the so-called Clean Energy Supplements) that reports appeared in the press that such cheques would, or did, lead to an increase in money spent at 'the pokies'[4] (Australian Financial Review, 2012).

We have formally tested these claims. We first modelled real monthly net expenditure[5] per EGM in 62 local government areas (LGAs) across the state of Victoria for the period July 2004 to June 2012. The model specification used linear regressions controlling for seasonality, a linear time trend and LGA specific effects. We obtained an

[1] The actual NBP was much larger than just the stimulus cheques to households. It included, among other things, free roof insulation for households, the building of new multi-purpose school halls and libraries (the Building Education Revolution), some 20,000 new social and defence homes, and increased funding for local roads and community infrastructure.

[2] This constitutes 96% of families and singles, based on the statement in the same media release that 8.8 million constituted just under 80% of families and singles.

[3] Although it is a carbon pricing mechanism with a fixed price period until 1 July 2015 when the system becomes an emission trading scheme, we will refer to it by its more popular name.

[4] Pokies, or poker machines, is the term used in Australia for EGMs which are also commonly known as one-armed bandits, fruit machines, slot machines, or simply 'slots'.

[5] Net expenditure is the official term used in the industry for the total amount lost by players. From the perspective of the gaming venue this is revenue. From the perspective of the individual this is an expense.

estimate of the monthly anomaly in expenditure per EGM for each of the 96 months in the 2004-2012 financial years. This allowed us to compare the timing of the stimulus cheques with the Carbon Tax compensation cheques to anomalies in net expenditure per EGM. We found that the largest monthly anomalies in net expenditure per EGM coincided with the 2008-2009 stimulus cheques. We found no unexpected increases in net expenditure per EGM in the months when Carbon Tax compensation cheques were paid.

The remainder of this paper is structured as follows. In Section II we provide some background on the details of the ESS and NBP that applied to households, as well as an overview of gambling in Australia within a broader international context. A discussion of the data used and our estimation strategy is presented in Section III. The results are presented in Section IV and we end with concluding remarks and directions for future research in Section V.

II. **Background**

II.I. **Details on the economic stimulus cheques to households**

Australian households received two rounds of stimulus cheques in the 2008-09 financial year. Payments to pensioners and families in the first round (ESS) totalling $8.8 billion were announced on 14 October 2008 and made available from 8 December 2008. Under the ESS, a total of $4.8bn was paid to Australia's four million pensioners. Pensioners include senior Australians on the Age Pension as well as recipients of a Disability Support Pension.[6] Single pensioners received a lump-sum non-taxable cheque of $1,400 and couples received a combined $2,100. Individuals who were receiving Carer Allowance also received an additional $1,000 for each eligible person in their care. A further $3.9bn was made available to about 2 million families (covering 3.9 million children) who received Family Tax Benefit Part-A or who had dependants eligible for Youth Allowance, Abstudy or Veterans' Children's Education Scheme payments. Families received $1,000 for each eligible dependant in their care.

Although there may have been political reasons to make the first round of stimulus cheques available to pensioners and families with dependants, a more practical reason might have been that the only means available to the Government to dispense money quickly was to use its social security clearing house, Centrelink. Alternatively,

[6] Those eligible for payments were: Age Pensioners; Disability Support Pensioners; Carer Payment recipients; Wife and Widow B Pensioners; Partner, Widow and Bereavement Allowees; Veterans' Affairs Service Pensioners; Veterans' Income Support Supplement recipients; Veterans Affairs Gold Card holders eligible for Seniors Concession Allowance; Those of age pension age who receive Parenting Payment, Special Benefit, or Austudy; and Self Funded Retirees holding a Commonwealth Senior Health Card.

pensioners and families in receipt of Family Tax Benefits may have been perceived as having a high marginal propensity to consume which would make the stimulus more effective.

The second round of stimulus cheques was initially announced on 3 February 2009, but revised on 13 February 2009 due to opposition by the Liberal-National coalition (Leigh, 2012). The second round of stimulus cheques included $12.2 billion in payments. The payment most Australians seem to remember is the Tax Bonus Payment which paid $900 if a 2007-08 income tax return was lodged by 30 June 2009. In addition, families eligible for Family Tax Benefit Part-B on 3 February 2009 received the Single Income Family Bonus of $900. Any family in receipt of Family Tax Benefit Part-A on 3 February 2009 who had school aged children (aged 4 to 18 years) also received the Back to School Bonus of $950 per eligible child. Students eligible for social security payments also received this $950 in the name of the Training and Learning Bonus. All these stimulus cheques were cumulative. Table 1 summarizes the stimulus payments:

TABLE 1: Summary of 2008-2009 stimulus packages

	Date	**Amount**	**Eligibility**
Economic Security Strategy			
Pensioner payments	December 2008	$1400 for singles, $2100 for couples	Pensioners, carers and seniors
Carer payments	December 2008	$1000 per person cared for	Carers
Child payments	December 2008	$1000 per child	Family Tax Benefit-A recipients
Nation Building and Jobs Plan			
Tax Bonus for Working Australians	April - May 2009	up to $900 per individual	Tax payers below $100K
Back to School Bonus	March 2009	$950 per child (aged 4-18)	Family Tax Benefit-A recipients
Single-Income Family Bonus	March 2009	$900 per family	Family Tax Benefit-B recipients

Notes: The Tax Bonus for Working Australians paid $900 to taxpayers with taxable income up to and including $80,000. The payment was reduced to $600 for individuals with taxable incomes between $80,000 and $90,000 and $250 for taxable incomes between $90,000 and $100,000 (above which the payment was reduced to zero).

There were no caps on the amount of stimulus money a family could receive, so depending on the make up of the household it was possible to received very large sums. For example, Leigh (2012) discussed a hypothetical family with a household income of $80,000 and two school-aged children that would have received about 4 percent of their annual household income from the 2009 stimulus cheques. This estimate increases to approximately 7 percent of annual household income if the December 2008 cheques are accounted for.

II.II. **Details on the lump-sum compensation for the introduction of the Carbon Tax**

Compensation paid to Australian households for the introduction of the Carbon Tax took the form of changes to the (income) tax system and increases in transfers paid to families in the form of increased family benefits and pensions (labelled Clean Energy Supplements). Changes to the tax system had the effect of spreading these benefits over an entire (fiscal) year for most tax payers. From 1 July 2013 the increase in family payments, pensions and allowances, too, will be spread over the year as they will be rolled into the fortnightly benefits payments. Only for the first year of the Carbon Tax did compensation for families with dependants and pensioners take the form of upfront lump-sum cheques. These were sent out in May and June 2012, before the Carbon Tax took effect.

Individuals in receipt of a pension or allowance, or self-funded retirees holding a Commonwealth Seniors Health Card, received a cheque that amounted to 1.7% of the maximum annual pension or allowance. For example, a person in receipt of the Age Pension or Disability Support Pension would have received a $250 cheque if they were single or $190 each if they were part of a couple ($380 combined). Those in receipt of an allowance payment received $160 if single without dependants and $300 as a couple without dependents.[7]

In addition to the clean energy supplement of 1.7% of the maximum pension/allowance, families with dependent children in receipt of Family Tax Benefits (FTB) also received a 1.7% increase in the maximum rate of FTB Part-A. This amounted to a payment of $109.50. Further, families reliant on a single income received compensation of up to $300 in the form of a new Single Income Family Supplement. The total effect of the Carbon Tax compensation was approximately $325 million paid to more than 1.6 million families. In Victoria, 415,400 families shared $79 million (Harrison, 2012).

II.III. **Gambling in Australia and abroad**

Australia is often referred to as 'the lucky country'[8] and one is inclined to think Australians take that literally given their love of gambling. When measured as net expenditure per adult, Australia has the highest gambling rate in the world (The Economist, 2012a). Despite having a population of just close to 23 million, net expenditures on gambling in Australia account for more than 5% of the world's total (see Table 2).

[7] These rates were taken from the press release 'Clean Energy Advance Rates - March 2012' that lists some 80+ cases of different levels of clean energy supplements for the myriad of different social security payments. See FaHCSIA.

[8] Donald Horne wrote a book in the 1960s with this title. Although the title was sarcastic (Horne called Australia "a lucky country, run by second rate people who share its luck") it is often used as a term of endearment.

TABLE 2: Leading ten gambling nations by gross win 2012

Rank	Country	Gross Win 2012 (€ bn)	% of Global Total
1	United States	80.45	25.10
2	China (incl. Hong Kong & Macau)	49.91	15.60
3	Japan	31.09	9.70
4	Italy	19.05	5.90
5	Australia	16.98	5.30
6	United Kingdom	15.07	4.70
7	Canada	12.34	3.80
8	Germany	10.7	3.30
9	France	10.36	3.20
10	Spain	9.46	2.90
	Total	320.95	100.00

Notes: Proprietary data from H2 Gambling Capital. Available from: h2gc.com 'Gross win' is the total amount the casinos won (and the patrons lost) in 2012

But what distinguishes Australia is the pervasiveness of EGMs and their share of total net expenditure on gambling. EGMs are the main method of gaming in Australia. In 2008-09 Australians lost about $10.4bn on EGMs, or 55% of the total net expenditure on gambling (see Table 3 in the appendix). This was about the same as the net expenditure on EGMs in the state of Nevada (including Las Vegas) and New Jersey's Atlantic City combined.[9]

II.IV. **The electronic gaming machine (EGM) data**

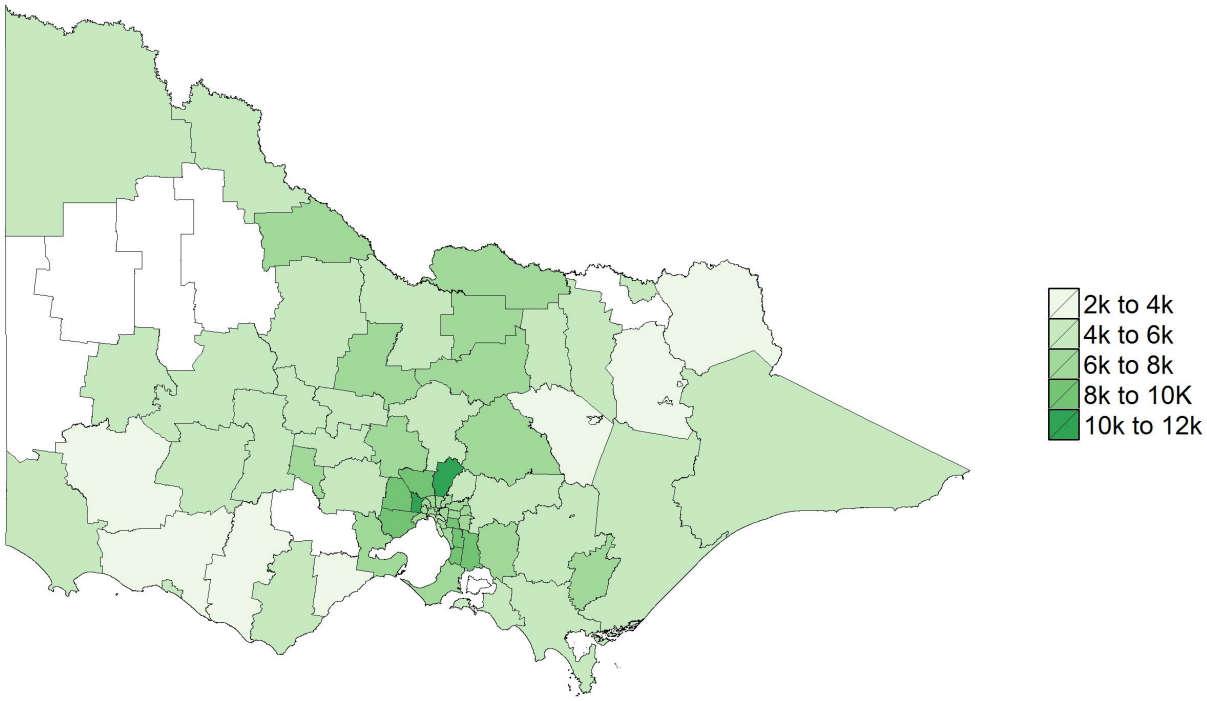
Data on net expenditure at EGMs have been gathered from various publications made publicly available by the Victorian Commission for Gambling and Liquor Regulation (VCGLR). Most official data in Australia are collected under codes of compliance, but rarely are government data accessible to the public.[10] The VCGLR is a notable and laudable exception. The dataset we constructed has monthly net expenditure on EGMs for 62 Victorian LGAs from July 2004 to June 2012 (inclusive), or 96 monthly observations in 62 LGAs for a combined 5952 observations. Victoria has 79 LGAs, but not all LGAs have EGMs and some LGAs have all their EGM licenses in one or two venues. Publishing net expenditure on EGMs in these cases may reveal sensitive business information as it could potentially be linked to particular venues. To avoid this the VCGLR combines some LGAs for reporting purposes.

[9] Data from the publications 'Nevada Gaming Revenues, 1984-2011' and 'Atlantic City Gaming Revenue' as published by the University of Nevada Las Vegas Centre for Gaming Research.

[10] For an overview of accessible gaming data see Farrell (2012).

Data also exist for the period prior to 2004, but not only had the market for EGMs stabilised by 2004 (having expanded rapidly after its introduction in 1992), the make up of LGAs for reporting purposes no longer changed after 2004. We merged the number of EGMs in the LGA as well as CPI data from the ABS to construct real monthly net expenditure per EGM from July 2004 to June 2012. This is the dependent variable of interest in our model. Figure 1 shows average monthly net expenditure per EGM for each LGA in Victoria over the period July 2004 to June 2012.

FIGURE 1: Average real monthly net expenditures per EGM (July 2004 to June 2012)



Notes: The Victorian Commission for Gambling and Liquor Regulation (VCGLR) combines figures from several LGAs and applies the results to each. Hence Pyrenees is equal to Ararat; Loddon, Mount Alexander and Hepburn are equal to Central Goldfields; Moyne, Southern Grampians and Queenscliffe are equal to Corangamite; Towong is equal to Mansfield; Moira, Strathbogie and Gannawarra are equal to Murrindindi. Six LGAs without data are coloured white (Indigo, Buloke, Golden Plains, Hindmarsh, West Wimmera and Yarriambiack) as is French Island.

The market for EGMs is highly regulated. In addition to a state-wide cap, there are also regional caps on the number of machines. In case no regional cap applies, municipal caps apply. In a market with a state-wide cap but no regional or municipal caps one would expect expenditure per EGM to be similar across LGAs. If not, then moving machines from a low yielding LGA to a high yielding LGA would increase profits.

One implication of these restrictions is that net expenditure per EGM varies widely across Victoria, with total net expenditure per EGM in 2011-12 as high as $150,000+ per year in the City of Whittlesea and as low as $35,000 per year in the Shire of Gannawarra. Apart from the spread in the net expenditure per EGM, the LGAs also differ in other aspects such as the exposure to tourism flows or seasonality (e.g. the Surf Coast and Alpine region) and other, unobservable, differences. We address these issues in the model specification outlined below.

III. **Estimation strategy**

Our basic model specification is a linear regression of real monthly net expenditure per EGM on a constant, a linear time trend (in calendar years) and 11 calendar month dummies, with January taken as the reference month (i.e. $\mu_1 = 0$). Subscript i represents the LGA (of which we have 62) and subscript t represents the period (of which we have 96). The basic model is a single OLS regression on the pooled data:

$$Y_{it} = \alpha + \gamma * Year_t + \mu_2 * Feb_t + \mu_3 * Mar_t + \cdots + \mu_{12} * Dec_t \quad (1)$$

We expect diversity in unmeasured LGA specific characteristics across LGAs to explain most variation in the dependent variable. It is inappropriate to assume, for example, that unmeasured factors affecting gaming behaviour in the Surf Coast (a tourist economy) are the same as those in Melbourne. To address this, we estimate a single fixed effects regression that allows for a unique intercept term for each LGA:

$$Y_{it} = \alpha_i + \gamma * Year_t + \mu_2 * Feb_t + \mu_3 * Mar_t + .. + \mu_{12} * Dec_t \quad (2)$$

Allowing the intercept to vary by LGA greatly improves the model fit. In the standard OLS regression (Equation (1)) the R-squared is .03 but in the fixed effects regression (estimated using the absorbing technique) the R-square is .92. However, simply looking at the raw data makes it apparent that assuming a single common time trend and a single common monthly seasonality pattern for all LGAs is inappropriate. For instance, EGM operators in the Shire of Surf Coast make the bulk of their money during two months in summer, a time when Victorians on average spend less on EGMs. For illustration, Figures 4 and 5 in the Appendix compare additive time series decompositions of net monthly expenditure per EGM for the Surf Coast with Victoria as a whole. Given these differences a more desirable specification is to estimate Equation (1) for each of the 62 LGAs separately, from the Borough of Queenscliffe to the Shire of Yarra Ranges.

For i = 1,2,3, . . . ,62:

$$Y_{it} = \alpha_i + \gamma_i * Year_t + \mu_{i\_2} * Feb_t + \mu_{i\_3} * Mar_t + .. + \mu_{i\_12} * Dec_t \quad (3)$$

Equations (2) and (3) serve as the baseline models. We then re-estimate them 96 times and each time include an indicator for a specific month in a specific year. That is, a different dummy variable is used to identify each of the 96 periods in turn. The coefficient on this variable is interpreted as the estimated monthly anomaly (EMA). Equation (2) becomes:

$$Y_{it} = \alpha_i + \gamma * Year_t + \mu_2 * Feb_t + \mu_3 * Mar_t + .. + \mu_{12} * Dec_t + \sum_{t=1}^{96} EMA_k * I_{(t=k)} \quad (4)$$

where $I_{()}$ is an indicator function. After estimating Equation (4) 96 times (for $k = 1, 2, 3, \ldots, 96$) we get 96 estimates of EMA_k, one for each month. From Equation (3) we have:

For i = 1,2,3, . . . ,62:

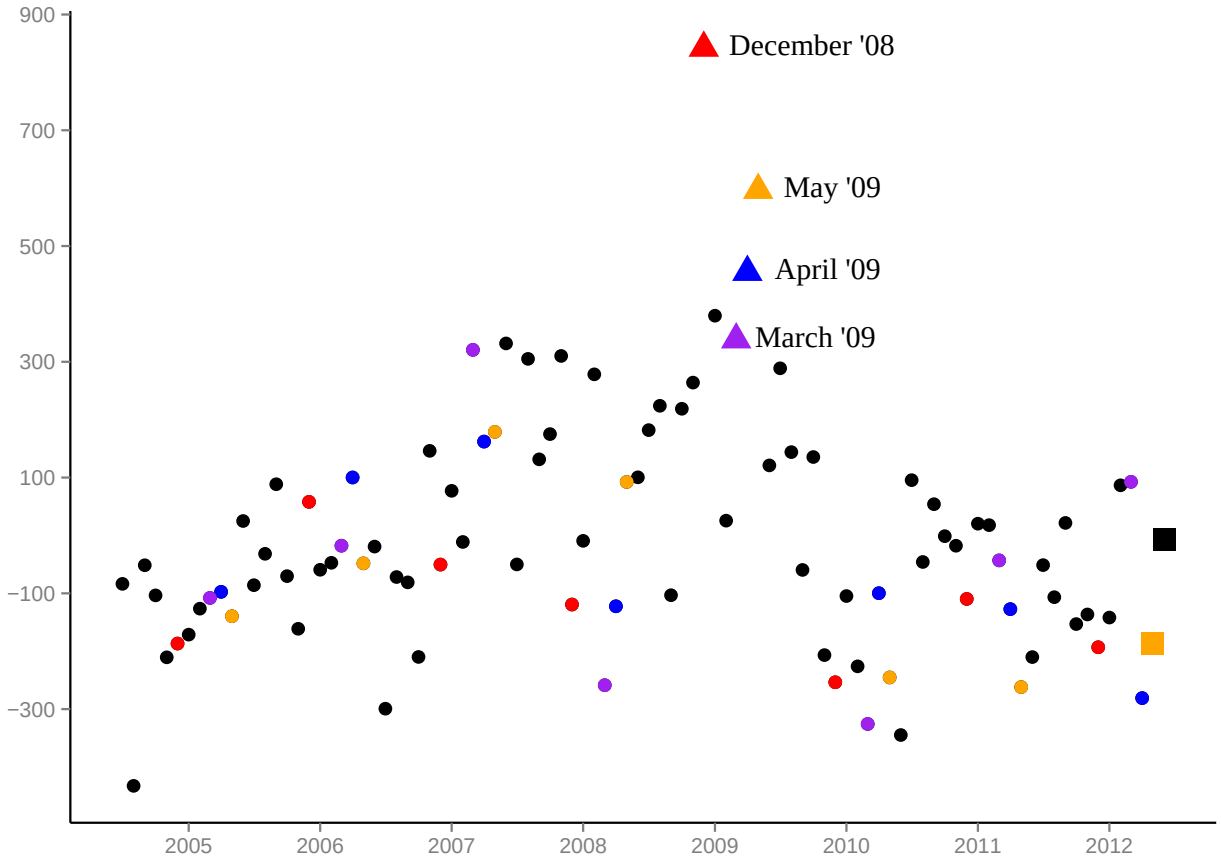
$$Y_{it} = \alpha_i + \gamma_i * Year_t + \mu_{i\_2} * Feb_t + \mu_{i\_3} * Mar_t + .. + \mu_{i\_12} * Dec_t + \sum_{t=1}^{96} EMA_{i\_k} * I_{(t=k)} \quad (5)$$

We estimate the set of 62 equations 96 times (for $k = 1, 2, 3, \ldots, 96$) such that for each month k in (5) we have 62 estimates EMA_{i_k}.

IV. **Results**

Figure 2 plots the 96 EMA_k estimated by Equation (4). Increases in EGM net expenditures are most pronounced in months when stimulus cheques were distributed. The December 2008 anomaly of more than $840 per EGM is by far the largest. The EMAs in May and June 2012, when households received compensation for the impending Carbon Tax, are negligible by comparison.

FIGURE 2: Estimated monthly anomalies from July 2004 to June 2012



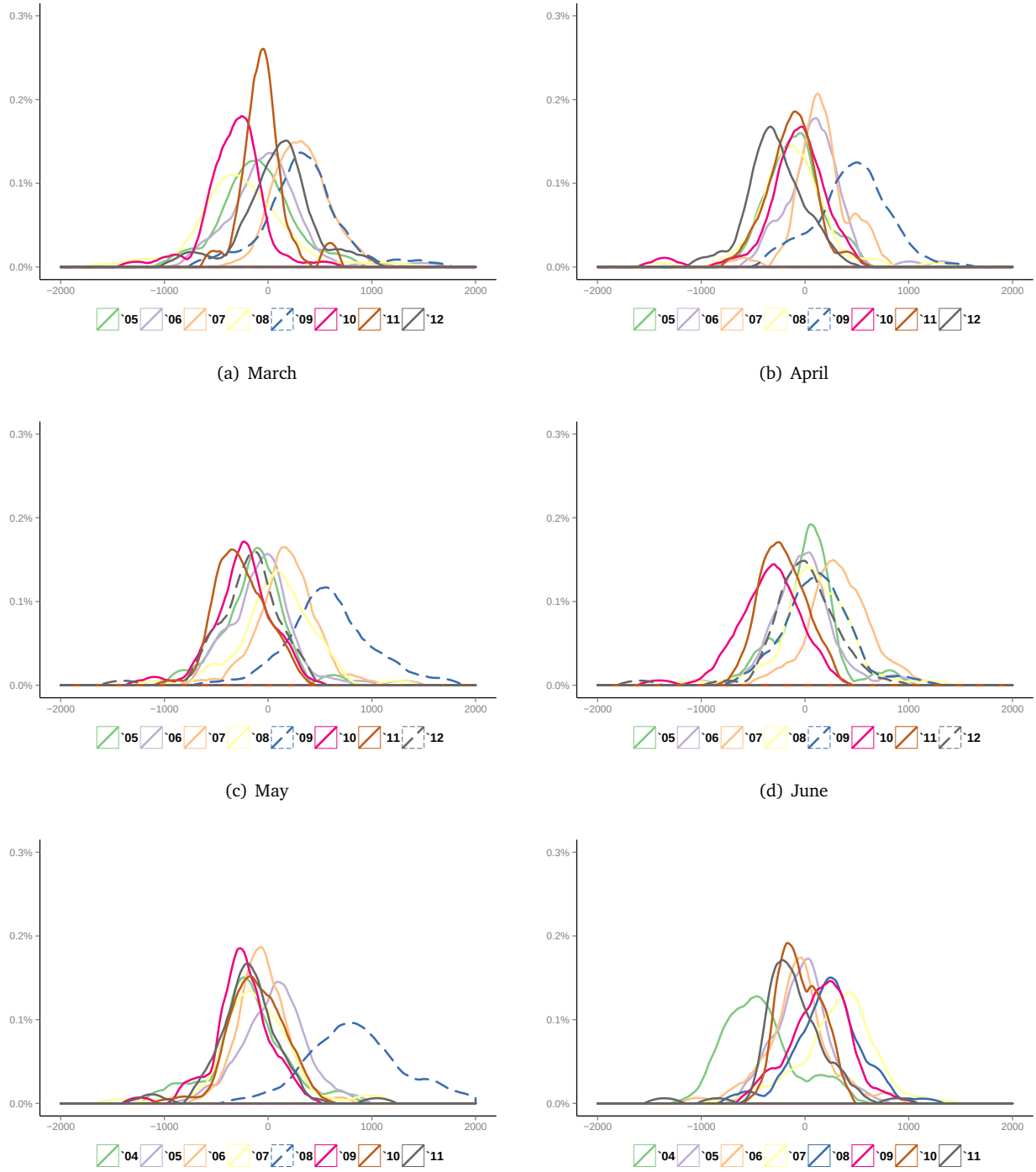
Notes: Coefficients from 96 linear regression models each with a dummy variable for a specific period (the EMA_k from Equation (4)). Triangles identify periods when stimulus packages were received. Squares identify periods when Carbon Tax compensation was received. Purple identifies Marchs from 2004-2012. Blue identifies Aprils from 2004-2012. Orange identifies Mays from 2004-2012. Red identifies Decembers from 2004-2011. Table 4 in the appendix lists the 96 estimated EMA_k and provides (panel corrected) standard errors.

Equation (5) produced 62 estimates for each of the 96 periods (the EMA_{i_k}). This created 5,952 estimated monthly anomalies in total or 62 for each time period. Figure 3 plots kernel densities of EMA_{i_k} for months when households received windfall income along with August 2004, the only period in the series that stands out.[11]

The densities for December 2008 and April-May 2009 are distinctly different from their respective counterparts in other years. In contrast, the densities for May and June 2012 are not at all unusual. Figure (6) in the Appendix displays results for the remaining months. These show overlapping densities and no anomalies. One exception is January 2009, which suggests some of the December 2008 stimulus was spent in the following month. It is only though Figures 3 and 6 that one can truly see the economic significance of the cheques and get a sense of how much a specific period stands out. The estimates for each monthly anomaly EMA_k from the fixed effects

[11] It is beyond the scope of the current paper to further investigate August 2004, but a possible answer could lie in August being a month when tax refunds and end-of-year Family Tax Benefits are paid upon reconciliation of tax returns and payments made by the Family Assistance Office.

FIGURE 3: Kernel densities of monthly anomalies over LGAs for selected months



(a) March

(b) April

(c) May

(d) June

(e) December

(f) August

Notes: Kernel densities of the coefficients from 96 sets of 62 linear regression models (the EMA_{i_k} from Equation (5)) for selected calendar months. Kernel densities use Epanechnikov kernels. Dotted lines represent periods with windfall income.

specification in Equation (4 are reported with (panel corrected) standard errors in Table 4 in the Appendix.

V. **Concluding remarks**

The Carbon Tax cheques distributed in May and June 2012 cannot be directly compared to the stimulus cheques paid in December 2008 (ESS) and March-May 2009 (NBP). The Carbon Tax cheques were much smaller (hundreds rather than thousands of dollars) and paid when households were expecting an increase in their gas and energy bills on 1 July 2012. Moreover, the Carbon Tax payments were framed as a rebate on rising costs of living due to a forthcoming tax. The stimulus cheques were framed as a bonus with a message to spend those cheques to stave off recession. Individuals are more likely to spend and spending rates are much higher when windfall income is framed as a bonus rather than a rebate (Epley et al., 2006; Epley and Gneezy, 2007).

The ESS delivered $8.8 billion in cheques to Australian households in December 2008. According to recent estimates, Australia's population was 21,644,000 with 5,364,800 (or 25%) living in Victoria in December 2008 (Australian Bureau of Statistics, 2012). This suggests Victoria's share of the stimulus was about $2.2 billion. Given the estimated anomaly for December 2008 of $841.40 per EGM and 26,797 EGMs in Victoria in December 2008 this implies 1% of the total stimulus allocated to Victoria was spent on EGMs (or about $22.5 million). If only a subset of Victorians frequent EGMs this estimate is misleading.

A recent study that profiled gaming participation and preferences in Victoria over the period August to October 2008 (Victorian DOJ, 2009) estimated 21.46% of Victorian adults used EGMs during the previous 12-month period. Allocating the $2.2 billion over 4.1 million adults implies an average stimulus of $536 per adult. This assumes the increase in EGM expenditure of $22.5 million was due to 861,000 (21.46%) of Victoria's 4.1 million adults (Pearson, 2010, p.4), or about $26 per adult. The ratio of $26 to $536 is 4.85%. This estimate suggests those who use EGMs spent, on average, about 5% of their stimulus cheques at EGMs. This estimate relies on averages and variation across individual gamblers may be substantial. Problem gamblers, for example, may have spent considerably more than 5% of their stimulus cheques at poker machines.

This paper has demonstrated how windfall income increases expenditure at poker machines. The estimates presented here rely on expenditure for Victoria as a whole. A crucial path for future research is examining the variation in expenditure across different sub-populations in response to policy changes. We are unable to consider the variation in stimulus money allocated across LGAs with publicly available data. If existing government data

were freely available far better estimates of the share of stimulus money spent at EGMs could be computed. For instance, data from Centrelink and the Australian Taxation Office would reveal the exact amount of stimulus received by LGA under both the ESS and NBP. This would provide a means to estimate how much of the stimulus was spent at EGMs at the local level.

EGM regulation in Australia is a widespread political and economic concern with considerable normative implications. A mandatory pre-commitment trial is scheduled to start this year in the Australian Capital Territory and additional reform is a likely bargaining point for future political negotiations (The Economist, 2012b). In July 2012 a ban on ATMs in gaming venues also came into effect in Victoria. Further quantitative research will help determine the impact of these policy changes and provide guidance for reform based on efficacy rather than advocacy.

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Appendix

TABLE 3: Total gambling expenditure (million AUD): 2008-2009

	ACT	NSW	NT	QLD	SA	TAS	VIC	WA	Total
Off-course bookmaker	-	-	-	-	0.025	-	16.251	-	16.276
On-course bookmaker	0.565	30.977	191.805	-	1.791	0.253	16.322	4.616	246.329
On-course totalisator	0.541	50.569	2.448	-	-	1.595	57.283	14.634	127.070
TAB	26.858	748.648	23.801	355.849	113.820	93.029	597.036	257.622	2216.663
Total Racing	27.964	830.194	218.055	355.849	115.636	94.877	686.892	276.872	2606.399
Casino	18.836	747.799	114.730	579.785	134.509	113.914	1218.258	535.121	3462.952
Gaming machines	175.114	4772.059	78.665	1860.606	750.653	123.977	2707.278	-	10468.352
Instant lottery	1.904	66.232	1.384	93.659	12.440	3.594	17.414	38.903	235.531
Interactive gaming	-	-	0.761	-	-	-	-	-	0.761
Keno	0.943	105.416	8.180	96.438	16.702	25.792	6.587	-	260.058
Lotteries	0.925	44.150	-	0.557	-	0.448	1.411	-	47.491
Lotto	17.737	505.339	16.185	342.388	98.001	26.804	419.573	278.880	1704.907
Minor gaming	-	-	-	-	-	-	-	23.224	23.224
Pools	0.098	3.766	0.023	1.832	0.321	0.114	1.229	0.679	8.062
Total Gaming	215.557	6244.761	219.929	2975.265	1012.626	294.643	4371.750	876.807	16211.339
Bookmaker (and other)									
Fixed Odds	-	6.040	62.445	-	0.418	-	5.215	0.443	74.561
Pool Betting	-	-	-	-	-	-	-	-	-
TAB Fixed Odds	-	65.252	-	12.359	5.072	6.360	40.274	9.459	138.776
TAB Tote Odds	-	4.128	-	0.864	-	0.022	2.559	0.577	8.150
Total sports betting	0.000	75.420	62.445	13.223	5.490	6.382	48.048	10.479	221.487
Total all gambling	243.521	7150.375	500.429	3344.337	1133.752	395.902	5106.690	1164.159	19039.165

Notes: Total gambling expenditure 2008-09 reproduced from the Queensland Government's Office of Economic and Statistical Research oesr.qld.gov.au

FIGURE 4: Time series decomposition of real monthly net expenditure per EGM over July 2004 to June 2012 - Surf Coast

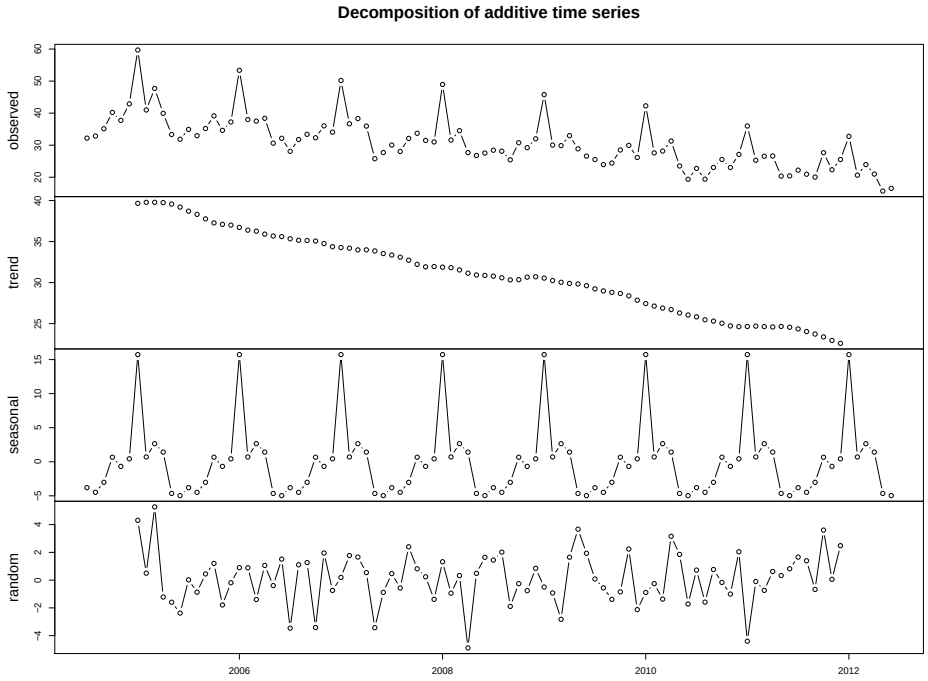
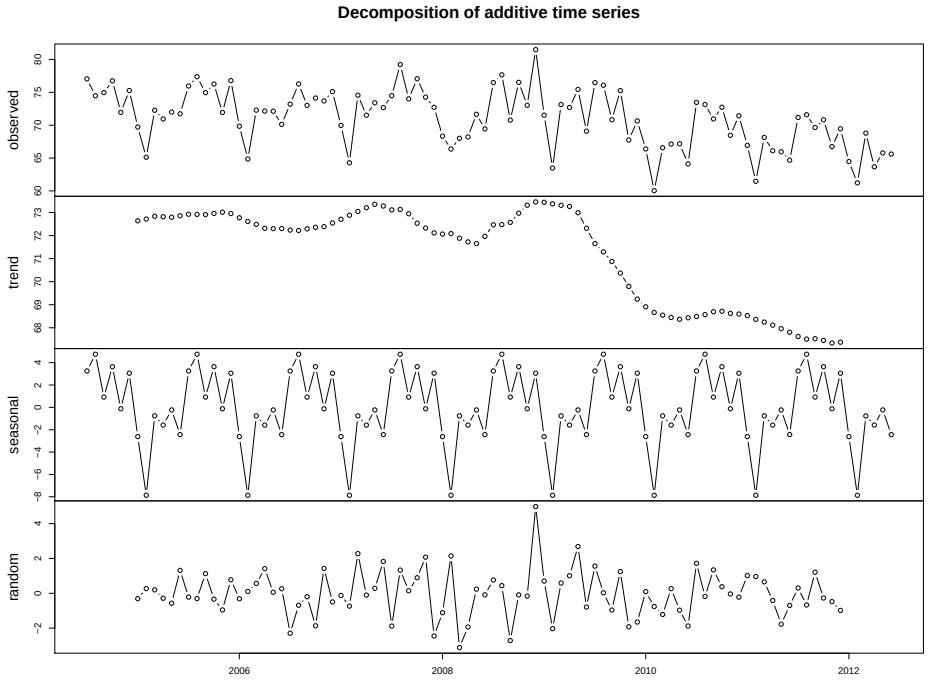
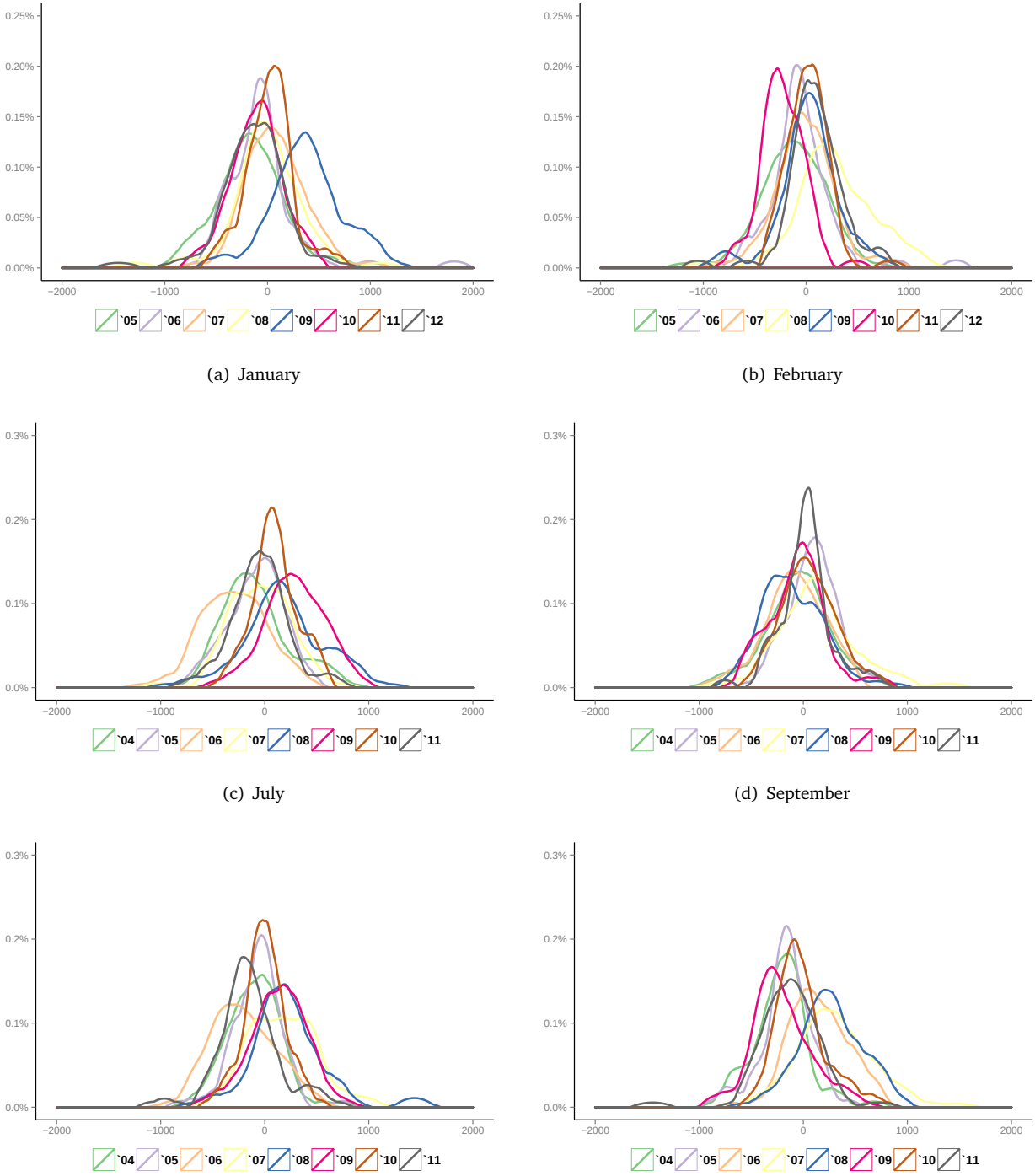


FIGURE 5: Time series decomposition of real monthly net expenditure per EGM over July 2004 to June 2012 - Victoria



Notes: Decomposition of the observed time series into a seasonal component, a trend component and a remaining (random) component. The original series of real monthly net expenditure per EGM has been divided by 100 to prevent the legend text of the Y-axes from overlapping. The small circles represent the months. The first observation is July 2004.

FIGURE 6: Kernel densities of monthly anomalies over LGAs for remaining months



(a) January

(b) February

(c) July

(d) September

(e) October

(f) November

Notes: Kernel densities of the coefficients from 96 sets of 62 linear regression models (the EMA_{i_k} from Equation (5)) for the remaining calendar months not displayed in Figure (3). Kernel densities use Epanechnikov kernels.

TABLE 4: Estimates of monthly anomalies July 2004 to June 2012 - fixed effects (Equation (4))

Period	EMA_k	SE	Period	EMA_k	SE	Period	EMA_k	SE
Jul '04	-83.61	193.89	Mar '07	320.67	189.04	Nov '09	-206.66	190.69
Aug '04	-432.61***	188.99	Apr '07	162.19	191.14	Dec '09	-253.61	190.10
Sep '04	-51.45	194.01	May '07	178.88	190.98	Jan '10	-104.65	191.56
Oct '04	-103.50	193.79	Jun '07	331.78*	188.84	Feb '10	-226.11	190.46
Nov '04	-210.50	192.88	Jul '07	-50.05	191.35	Mar '10	-325.65*	188.95
Dec '04	-186.73	193.14	Aug '07	305.09	188.87	Apr '10	-99.74	191.58
Jan '05	-171.30	193.29	Sep '07	131.50	190.95	May '10	-245.27	190.21
Feb '05	-126.45	193.65	Oct '07	175.15	190.58	Jun '10	-344.77*	188.60
Mar '05	-107.91	193.76	Nov '07	310.17*	188.78	Jul '10	95.57	192.49
Apr '05	-97.39	193.82	Dec '07	-119.34	191.0	Aug '10	-45.79	192.68
May '05	-139.48	193.55	Jan '08	-9.31	191.41	Sep '10	54.04	192.65
Jun '05	25.01	194.06	Feb '08	278.36	189.30	Oct '10	-1.19	192.73
Jul '05	-85.87	192.53	Mar '08	-258.68	189.5	Nov '10	-17.74	192.73
Aug '05	-31.72	192.71	Apr '08	-122.33	191.0	Dec '10	-109.65	192.41
Sep '05	88.52	192.52	May '08	92.47	191.18	Jan '11	20.35	192.72
Oct '05	-70.23	192.60	Jun '08	100.49	191.14	Feb '11	17.84	192.73
Nov '05	-161.22	192.03	Jul '08	182.05	190.51	Mar '11	-43.03	192.68
Dec '05	58.07	192.64	Aug '08	224.04	190.05	Apr '11	-127.30	192.30
Jan '06	-59.24	192.64	Sep '08	-103.22	191.1	May '11	-261.91	190.87
Feb '06	-47.25	192.67	Oct '08	218.86	190.11	Jun '11	-210.10	191.54
Mar '06	-17.67	192.73	Nov '08	264.10	189.51	Jul '11	-51.21	194.01
Apr '06	100.19	192.46	Dec '08	842.23***	171.03	Aug '11	-106.62	193.77
May '06	-48.17	192.67	Jan '09	379.66**	187.45	Sep '11	21.67	194.06
Jun '06	-19.16	192.72	Feb '09	25.58	191.40	Oct '11	-153.06	193.45
Jul '06	-299.27	189.41	Mar '09	338.33*	188.28	Nov '11	-136.48	193.58
Aug '06	-71.80	191.71	Apr '09	454.96***	185.70	Dec '11	-193.10	193.07
Sep '06	-81.02	191.67	May '09	596.61***	181.47	Jan '12	-141.82	193.54
Oct '06	-209.87	190.65	Jun '09	121.05	191.02	Feb '12	86.68	193.88
Nov '06	146.18	191.27	Jul '09	288.80	189.58	Mar '12	92.67	193.85
Dec '06	-50.29	191.78	Aug '09	144.01	191.29	Apr '12	-280.97	191.95
Jan '07	77.14	191.69	Sep '09	-59.55	191.76	May '12	-186.53	193.14
Feb '07	-11.21	191.85	Oct '09	135.56	191.35	Jun '12	-6.99	194.08

Notes: These are the same EMA_k displayed graphically in Figure (2), but included here are the panel corrected standard errors (Beck and Katz, 1995; Bailey and Katz, 2011).