

Are Stimulus Checks an Effective Fiscal Policy Tool?

I. Abstract

Over the past fifty years, the United States government has several times turned to tax rebates as a means to stimulate a staggering economy. A recent example of these efforts, the Recovery Rebates and Economic Stimulus for the American People Act of 2008, signed into law in February, was designed to fuel economic growth by injecting money into the hands of consumers with tax rebates. In investigating the efficacy of this type of legislation, this paper presumes that tax rebates are only effective if they cause individuals to quickly increase their consumption patterns, and therefore contribute to GDP growth. Consumers may instead choose to save the additional income gained from tax rebates, or spend the money to pay off personal debt, both of which are assumed to be contrary to the goal of stimulating economic growth in the short run, regardless of their possible positive long term effects. Regressions of consumption functions show that the stimulus checks received by consumers had no significant immediate effect on the level of consumption in the United States, thus proving stimulus tax rebates to be an ineffective policy.

II. Motivation and Hypothesis

One doesn't have to delve deep to understand the significance of stimulus payments like the one implemented in 2008. In a post-housing-bubble economy and after the trauma to the United States financial system, the word stimulus has become ubiquitous in current economic vocabulary. In 2001, the United State government spent \$38 billion giving substantial rebate checks to 92 million consumers. The most recent act in 2008 amounted to over \$152 billion this

year to provide tax rebates to over 128 million consumers, and there are further implications as there continue to be discussions of further stimulus packages with the arrival of a new administration. (The White House) When formulating policies to shock an economy with weak economic growth, it seems instinctive to aim on injecting money into the hands of consumers to stimulate consumption levels, which typically account for two-thirds of GDP and are a critical determinant of aggregate demand. While politicians claim that these rebates provide a “booster shot for our economy”, many economists are skeptical, drawing different conclusions about the effectiveness of these costly policies in times of record national debt (The White House). This paper investigates whether stimulus packages are a cost-effective policy for the government to engage in or if they are outdated tools used in inauspicious times. In keeping with Milton Friedman’s Permanent Income Hypothesis it is the hypothesis of this paper that stimulus rebates provide no boost to the economy in terms of stimulating household’s consumption habits.

III. Literature Review

There is a wide range of published studies concerning the effectiveness of past tax rebates on consumption patterns. These studies use various consumption functions and theories to explain consumer behavior, perhaps the most predominant of which being Friedman’s Permanent Income Hypothesis. A critical assumption of Friedman’s work divides income into two distinct categories, permanent and transitory income. Permanent income describes the income that consumers expect to continue receiving and living off of, while transitory income characterizes the unexpected changes in income that randomly occur, either boosting or taking away from one’s normal income. Friedman predicts that consumers will only act according to their permanent income so that any changes in transitory income will be initially saved and only gradually spent throughout their lifetime. (Mankiw 476) This has important implications for

stimulus checks, an inarguably transitory form of income. If the Permanent Income Hypothesis holds true, as this paper predicts, consumers will initially save their stimulus checks, and changes in overall consumption levels will not occur.

Nicholas Souleles produced a study unlike many of the other research papers on consumer responses to tax refunds by performing micro-level regressions of consumption patterns of households after receiving income tax refunds. It is worthwhile to consider Souleles's work since, like the recent economic stimulus checks, tax refunds are predictable and transitory. By using data from the Internal Revenue Service and the Consumer Expenditure Surveys, Souleles estimates the immediate change in consumption in the first quarter as a result of tax refunds. He finds that eighteen cents of every dollar received as a refund were spent, mainly on durables. He then furthers his test to account for liquidity constraints, which he finds affects twenty percent of American households. According to his research, while the total consumption response is much larger for the unconstrained households, constrained households are more likely to spend their rebate checks on food and nondurable goods. (Souleles) Liquidity constraints are an important consideration for the most recent stimulus checks as well, as increasing numbers of American households face significant levels of debt.

Slemrod and Shapiro used strikingly different techniques of study to account for the consumer response to the tax rebates of 2001. By conducting telephone surveys during the three months after consumers received their rebates, they attempt to determine the ways in which households use their rebate checks. Their survey finds that just over twenty percent of rebate recipients reported that their check would lead to increased spending, thus allowing Shapiro and Slemrod to conclude with doubts on the effectiveness of similar fiscal policies (Shapiro and Slemrod).

The Permanent Income Hypothesis is again put to the test by Chang-Tai Hsieh in her empirical study on the responses of Alaskans to payments from the Alaska Permanent Fund, a large payment made regularly to Alaskans, and comparisons of such to reactions to income tax refunds. Her findings suggest that households act on anticipated changes of income into their consumption predictions when they meet three criteria: large, regular, and easy to predict. She further postulates that small and irregular payments are not considered by households in their consumption decisions. (Hsieh) If similar results hold true for this study, consumers will not respond to the stimulus checks, which were not anticipated over a long period of time and are classified as irregular income.

In their own study of on the efficacy of the 1975 tax rebates, Modigliani and Steindel present several possible cases. They assert that temporary changes in taxes could quickly and significantly affect consumer expenditures if in reality consumers are too short sighted to act according to the Permanent Income Hypothesis and are unable to make a distinction between permanent and temporary changes in taxes. Or it could be the case that while no immediate significant change in consumption occurs, consumers may initially save the rebates in order to spend it later on durable goods. In direct contrast with Hsieh's conclusions, Modigliani and Steindel describe the argument of other economists that large transitory changes in income are converted to savings rather than consumption, while small changes are spent just as normal income. Like Souleles, they present a fourth argument that households constrained by credit rationing will rapidly spend a tax rebate and induce a sizeable response in consumption. (Modigliani and Steindel 176)

An abundance of research on stabilization policy was done in the 1970s because of the relevancy of the topic at that time. In 1968, a tax surcharge was imposed in an effort to reduce

aggregate demand. Because of the unpopularity of the surcharge with the American people, the surcharge was described as temporary, a factor which is presumed to play a role in their failure to stunt aggregate demand (Mankiw). In presenting their hypothesis that tax rebates are an unsuccessful means to stimulate consumption because of their transitory nature, Modigliani and Steindel turn to the savings rates during this period, finding that savings was sharply diminished during and after the temporary surcharge, but increased substantially after the 1975 tax rebates (178). They then present several separate econometric models used to empirically determine the effect of a rebate compared to a permanent tax change.

Their findings are somewhat mixed. The use of two models which estimate consumption with a single equation find that only a fraction of the tax rebates were returned to consumption in 1975. Two other models calculate consumption as a sum of many components including automobiles, furniture, other durables, nondurables, and services. These models predict a high estimate of immediate spending of the tax rebates. Despite the varying responses, Modigliani and Steindel conclude that the tax rebate is not an effective method of providing a prompt and temporary boost to consumption (Modigliani and Steindel). They attribute this finding to the Permanent Income Hypothesis.

IV. Analytical Framework

In order to best capture the effects of the stimulus checks on total expenditures in the United States, a consumption function needs to be presented which accounts for other possible determinants of consumption. The most basic consumption functions in economic theory present consumption as solely a function of disposable income. This Keynesian consumption function stems from the view that consumer's spending decisions are determined by the income they have

available, that is income received less taxes. One of the critical determinants of fiscal policy, consumers increase consumption as their income goes up but only by a fraction of the amount.

Economists have also shown the importance of wealth on consumer's consumption habits. In his study on wealth proxies in permanent income models, Elliot finds that the best explanations of consumer's spending habits use measures of wealth that account for the cyclical and often volatile nature of the prices of stocks and bonds. His data proves a systematic and positive relationship between the market evaluations of wealth and consumer's expenditures (Elliot 530). As such, if the markets are performing poorly during the months when consumers receive their tax rebates, they may be less inclined to spend their extra income as a result of this sort of wealth effect.

Similarly, consumer sentiment can have strong effects on consumption patterns in the United States. Given poor expectations for the economy, such as high inflation, a declining job market, or expected layoffs, consumers may become more hesitant about their spending habits, instead opting to save as they expect their permanent income to fall in the future. Despite having received a stimulus check for the government, if people are worried about losing their job in the near future, they are not going to be as likely to raise their consumption patterns. However, it is not just contemporaneous confidence that affects their decisions. If consumers felt poorly about the economy in the last quarter, their consumption patterns may continue to reflect that. Consumers may not be apt to quickly respond to immediate upturns expectations with their own dollars, given a preceding weak quarter.

Frequently, lags of consumption are used as indicators of current consumption. This is because it is possible that when deciding how much to consume, consumers do not only have to

consider their current income and spending habits, but also their pattern of spending in the last period. A consumer who bought a car or otherwise expensive durable good in the last period may be inclined to spend less in the current period. Many theories of consumption such as the Permanent Income Hypothesis and Life Cycle consumption theory focus on the tendencies of consumers to smooth their consumption across their life time.

V. Data

The data used in this study was primarily found on the Federal Reserve Economic Database (FRED). The numbers for consumption and disposable income were compiled by the United States Department of Commerce in the Bureau of Economic Analysis. Consumption was modeled using monthly Personal Consumption Expenditures, which were given in the billions at a seasonally adjusted rate and were chained to the year 2000 dollars. Personal Consumption Expenditures are a dollar measure of all the goods and services purchased by United States residents including durable and nondurable goods. The main component of PCE is purchases individuals made from private businesses, but purchases from nonprofit businesses and also certain purchases of goods and services that are provided by the government, including tuition and charges for water or sanitary services are also included (Bureau of Economic Analysis).

The data set for this paper was limited given the recent nature of the inquiry. The latest month available of Personal Consumption Expenditure data was October 2008, which only allows two months post the receipt of the stimulus checks to be analyzed. The data is limited at the opposite end of the spectrum by the passage of the Economic Growth and Tax Relief Reconciliation Act of 2001, which similarly entitled taxpayers to checks from the government. Therefore, the oldest time period analyzed is January 2002, although the inclusion of a lag in the

model further limits the data set to January 2003. If the paper were to include years prior to 2002, it is possible that the model would then be subject to changes in consumption expenditures that were provoked by the wrong tax rebate, for the purposes of this paper. The eighty-two observations of monthly consumption included ranged from \$7022.6 to \$8355.1 billions of dollars with a standard deviation of \$434.4 billion. Summary statistics of all variables are included in Table A.

Disposable income, calculated by subtracting personal current taxes from personal income, was modeled by the monthly estimates of Real Personal Disposable Income, which are also presented in billions of dollars chained to 2000 and are seasonally adjusted. Disposable income for this time period ranged from \$7532.3 to \$9119.1 billion and the standard deviation was \$422.4 billion.

In order to account for the general feeling of consumers, the University of Michigan's Consumer Sentiment Index was used. This index reflects the results of a telephone survey contacting five hundred consumers each month. The consumers are posed questions about their personal finances and buying plans and submit ratings on their expectations for the future of the economy, financial markets, and business conditions. Each month, sixty percent of those surveyed are participating for the first time, and forty percent are interviewed for a second time. Their responses are seasonally adjusted and are used to create an index, sixty percent of which accounts for consumer's expectations and forty percent accounts for the current situation. An index of one hundred equals the confidence of consumers in the first quarter of 1966 and is considered very strong. (Dismal Scientist) Lower numbers indicate weaker confidence. From 2002 to 2008, the minimum value of confidence was 56.4 and the maximum was 103.8, with a standard deviation of 10.0 points.

Wealth is measured by monthly opening values of the S & P 500, an index of the prices of five hundred large stocks that are actively traded in the United States. The S & P 500 is one of the most widely followed indexes of American stocks. Between the years of 2002 and 2008, the S & P 500 set records for an intraday highs and lows. The monthly closing information captures this wide divergence, as the minimum and maximum values are 815.28 and 1545.79 with a standard deviation of 185.7.

VI. The Econometric Model

Two very similar models are used in this paper. Both models are time series. Both models present consumption as a function of disposable income, wealth, consumer confidence, and two dummy variables: *stim* and *ann*. *Stim* is coded one if stimulus checks were received by consumers in that month either by direct deposit or mail, and zero if no consumers received stimulus checks in that month. *Ann* is coded one for the month in which the President signed the legislation granting the stimulus checks into action, and coded zero for all other months in the data set. The stimulus dummy variable captures the immediate change in consumption following consumers receiving their checks in the mail. The announcement dummy variable captures any change in spending habits consumers may have made immediately after they became aware that they were going to receive stimulus check.

It is possible that knowledgeable consumers were forward-looking enough to raise consumption before they even had their stimulus check in hand. Furthermore, if this is the case that consumers are forward looking, than it may be the case that consumers were anticipating the tax rebates before the President officially assigned the legislation on February 13, 2008. Between January 1, 2008 and January 31, 2008, the New York Times ran thirty-eight separate

stories, editorials, and op-ed pieces either in print or on the internet referring to the as of yet unsigned legislation granting consumers stimulus checks. Forward looking informed consumers might have been so assured of the legislation's passage that they were induced to immediately increase their spending even before having received the checks or watching the President sign the bill. That hypothetical January spending would be the success of the analyzed stabilization policy, and so should be accounted for. For this reason, a separate regression of both models for which the *ann* variable is coded one for January 2007 and zero for all other months is included.

The first model analyzed captures the relationship between consumption and the receipt of stimulus checks as:

$$\text{Equation (1) Consumption} = \beta_0 + \beta_1 \text{ disposable income} + \beta_2 \text{ wealth} + \beta_3 \text{ confidence} + \beta_4 \text{ stim} + \beta_5 \text{ ann} + \beta_6 \text{ cons_13} + \beta_7 \text{ conf_1} + \beta_8 \text{ conf_2}.$$

The variables *cons_13*, *conf_1*, and *conf_2* each represent lags used for consumption and confidence. Consumption is lagged twelve months, or one year, in order to avoid perfect collinearity between an explanatory and explained variable in the model. Lags of one month and of two months are included for confidence. A slight modification of this model is also analyzed in this paper in order to make the results more manageable in size and in comprehensibility. The modification to this model is given by Equation (1a).

$$\text{Equation (1a) Ln (consumption)} = \beta_0 + \beta_1 \text{ Ln (disposable income)} + \beta_2 \text{ wealth} + \beta_3 \text{ confidence} + \beta_4 \text{ stim} + \beta_5 \text{ ann} + \beta_6 \text{ cons_13} + \beta_7 \text{ conf_1} + \beta_8 \text{ conf_2}.$$

By regressing against the natural log of consumption, the coefficients of the variables now describe percentage changes in real personal consumption expenditures.

The second model analyzed in this paper, given by equation two, includes all of the same variables with the addition of two more: time and time squared. These are included in case there is a time trend that has an influence on people's consumption habits, either linearly or nonlinearly, as represented by the squared term.

$$\text{Equation (2)} \quad \text{Consumption} = \beta_0 + \beta_1 \text{ disposable income} + \beta_2 \text{ wealth} + \beta_3 \text{ confidence} + \beta_4 \text{ stim} + \beta_5 \text{ ann} + \beta_6 \text{ cons_13} + \beta_7 \text{ conf_1} + \beta_8 \text{ conf_2} + \beta_9 \text{ time} + \beta_{10} \text{ time}^2$$

A similar slight modification to this model is also included, for the same reasons. The equation to this modified model is given by Equation (2a).

$$\text{Equation (2a)} \quad \text{Ln (consumption)} = \beta_0 + \beta_1 \text{ Ln (disposable income)} + \beta_2 \text{ wealth} + \beta_3 \text{ confidence} + \beta_4 \text{ stim} + \beta_5 \text{ ann} + \beta_6 \text{ cons_13} + \beta_7 \text{ conf_1} + \beta_8 \text{ conf_2} + \beta_9 \text{ time} + \beta_{10} \text{ time}^2.$$

The second model and its modification serve to capture any omitted variable bias that was included in the first model by the exclusion of the time indicators. If there is a time trend in the data, then the first model incorporated those effects into the error term. Including more variables in any regression is known to raise the R squared value, so a comparison of the adjusted R squared values is also presented in the results to allow a comparison between the two models.

VII. Results

The first regression of equation one found all of the variables except the receipt of the stimulus checks, the announcement, and the one month lag of confidence to be significant. However, after performing the Breusch-Pagan/Cook-Weisberg test for heteroskedasticity, the null hypothesis of constant variance was rejected. This was corrected for by using the robust estimates. The robust standard errors did not change the significance of any of the variables.

However, as is typical in models with lagged dependent variables and time-series models, the model did include serial correlation, which creates a relationship between the error terms across time and can result in invalid test statistics. After correcting for this by using the Prais-Winsten regression iterated estimates, the results can be analyzed. These findings are presented in Table B, with the first number representing the coefficients on the variables holding all other variables constant and the lower bracketed number representing the standard error. Numbers with an asterisk are significant at the 90% level or higher.

As was predicted in the hypothesis, the receipt of the stimulus checks had no effect on consumer's consumption patterns. The coefficient on the dummy variable *stim* was highly insignificant and is only significant at the 15% level. Similarly, the coefficient on the dummy variable *ann*, no matter which month it was coded for, was even more insignificant, only being significantly different from zero at the 12% level of confidence. This means that people were not inclined to change their consumption patterns after receiving their checks between the months of May and August. The insignificance of the announcement dummy variable means that people were not motivated to change their consumption patterns immediately after being guaranteed a check from the government or after repeatedly hearing about it in January. The insignificance of this variable may also be due to the fact that all consumers are not well informed. It is possible that there was no immediate change in consumption after the bill was passed because consumers were not keeping up with the news.

These findings are consistent with the Permanent Income Hypothesis, which suggests consumers did view these payments as transitory changes in income and instead chose to spend the money gradually over time and with Shaprio and Slemrod's consumer survey. In 2001 they

found that consumers did not expect to spend their tax rebates, and it is clear that once again the stimulus checks did not encourage them in 2008 to do otherwise.

Also insignificant were all of the confidence indicators. Current confidence holds the most weight of the three and was found to be significant at the 89% level. The lagged indicators of confidence were both insignificant. Confidence lagged one month was more insignificant than the two month lagged indicator. This suggests that higher values of confidence do not encourage consumers to spend more money than they otherwise would. The insignificance of the lagged indicators suggests that overall consumption patterns are also not determined by how people felt about the economy in the past month. An interaction term between wealth and confidence was tested but was not found to be significant, so was excluded from the regressions. This interaction term would have captured the effects on consumption in the case of a nonlinear relationship. For instance, it could have been true that higher levels of the S & P 500 index induced more confidence, and thus increased real personal consumption expenditures.

There were three significant variables in the model: disposable income, wealth, and the yearly lagged consumption. The coefficient on disposable income suggests that an increase in disposable income of one billion dollars will increase consumption by .117 billion dollars. The significance and the effect of changes in disposable income are not surprising, disposable income is intuitively the most important factor of a person's spending. Holding all other factors constant, an increase in the S & P 500 index of one point will lead to a .4369 billion dollar increase in consumption. This finding of the significance of wealth in this model is the predicted result, given the previous work of Elliot. Finally consumption a year ago was significant at the 100% level. The adjusted R squared of this model, a measure of good fit, is 0.992, which means that over 99% of the variance of the explanatory variables is captured in the model.

By taking the natural log of disposable income and regressing the same set of variables against the natural log of consumption, the significant coefficients present us with elasticities of consumption. With this slight modification of the first model, the null hypothesis of constant error variance was not rejected, so no corrections of heteroskedasticity had to be made, however serial correlation remained in the model, so the AR(1) regression iterated estimates are again summarized.

In this modified version of the first model, given by Equation (1a), the natural log of disposable income, confidence, the lagged consumption, and wealth were all significant at the 99% percent level. This modification is beneficial in that the effects of the changes of variables are perhaps easier to comprehend in percentage terms. According to the estimates, if disposable income increases by one percentage point, then consumption will increase by nearly 12 percentage points. An increase in the S & P 500 index of one point is now determined to raise consumption by .00536 of a percentage point, which appears much less dramatic than it did in the unmodified first model. An increase of one point in contemporaneous confidence, found to be significant in this model, affects consumption by a .018 percent increase. The receipt of stimulus checks and the announcement of such were once again highly insignificant.

The second model includes the regression of two additional variables of time against consumption, time and time squared. Including only time in the regression was not found to be significant. Time squared was found to be individually significant and also jointly significant with time, so both variables are included in this regression. The regression of Equation (2) proceeded very similarly to Equation (1). The null hypothesis of homoskedasticity was rejected so robust estimates were used again to estimate the model, which again included serial

correlation according to the Durbin-Watson d-statistics, which was corrected for using the Prais-Winsten estimation procedures.

In this model, all of the variables found significant by Equation (1) were again significant as well as the time variables. Table B shows these coefficients and their standard errors. The receipt of stimulus checks and the announcement of their impending arrival were again highly insignificant. The coefficient on disposable income tells us that an increase in disposable income of one billion dollars led to an increase in consumption of .089 billion dollars, a muted effect compared to the first model. Wealth also had a smaller effect in this model: a one point increase in the S & P 500 index led to an increase in consumption of .3202 billion dollars. A one billion dollar increase in consumption one year ago led to an increase in consumption of .283 billion. The effects on time, since they are jointly significant are determined by sum of β_9 the coefficient on time and two times β_{10} , the coefficient of time squared. The findings of the model tell us that a year's passage of time leads to a nearly a \$16.2 billion increase in consumption, which is highly significant.

The regression of Equation (2a) presents similar findings, only disposable income, lagged consumption, wealth, and time are significant variables, all at the 99% confidence level, and their coefficients are less generous. An increase in disposable income of one percentage point leads to an increase in consumption by 10% and an increase in wealth by one point in the S & P 500 index leads to only a .00409% increase in consumption. The passage in time of one year leads to a 2% increase in consumption for these two years, an interesting indicator of a factor of GDP growth for the country.

Clearly, the two different models held very similar results. Although the two models differed in the number of variables regressed, the Adjusted R squared values remain very close. This suggests that the high level of the R squared measure is not just due to the numbers of variables regressed.

VIII. Conclusion

The Ordinary Least Squares estimates obtained from the regressions of a consumption function supports the originally stated hypothesis to be true. The Recovery Rebates and Economic Stimulus for the American People Act of 2008 did not satisfy its intended goal of stimulating short run consumption levels, as evidenced by the highly insignificant coefficients on the stimulus and announcement dummy variables. This empirical evidence on the efficacy of the stimulus packages of 2008 resonates with what many economists have already found to be true of similar previous policies.

Temporary increases (or decreases) in household income have no immediate effect on consumption levels or on aggregate demand. While this initially seems paradoxical in that basic economic theory suggests that an increase in “purchasing power” (income) leads to an increase in the demand for goods and services and should therefore raise consumption levels, the answer lies in the Permanent Income Hypothesis. Friedman’s observation that consumers choose to act according to their average income and instead allow the random deviations of transitory income to be absorbed by savings explains the shortfalls of this kind of stabilization policy.

Because stimulus tax rebates are an extremely costly endeavor for a government already burdened with a poorly performing economy and tremendous national debt, and these rebates do not achieve their goal, this paper suggests that they are a piece of legislation future policy makers should avoid. The 2008 stimulus plan of over \$152 billion was equal to one percent of that

year's GDP. Given these repeatedly predicted results, consumers may wonder why policy makers keep using this sort of stabilization policy. It may seem that their motivation is something other than for the consumer's and the economy's benefit or welfare. It could be that policy makers are unaware of the literature and past analyses of these types of policies. Or it could be that their objective is only reelection and stimulus checks make people happy and more likely to vote for the elected official.

However, just because temporary reductions in taxes and temporary rebates do not work, does not mean only permanent policies can be effective. One alternative, suggested by Modigliani and Steindel, is to use a policy that is benefits from its own temporary nature, such as temporary changes in sales taxes, which would create an immediate and impermanent increase in consumption at a lower cost to the government, exactly what an effective short run stabilization policy is meant to do.

Table A

Variable	Definition	Mean	Std. Dev.	Min	Max
time	time in months 1=01/02	41.5	23.81526	1	82
consumption	Real Personal Consumption Expenditures	7747.673	434.4284	7022.6	8355.1
ydisp	Real Personal Disposable Income	8160.13	422.4392	7532.3	9119.1
wealth	S & P 500 Index	1196.026	185.665	815.28	1545.79
conf	University of Michigan Consumer Sentiment Index	86.04634	10.00185	56.4	103.8
stim	1 = stimulus checks received that month	0.048781	0.216734	0	1
ann	1 = the month in which the bill was signed	0.121951	0.110432	0	1
cons_13	Consumption lagged one year	7644.325	395.1046	7022.66	82866.8
conf_1	Confidence lagged one month	86.39753	9.541894	56.4	103.8
conf_2	Confidence lagged two months	86.59875	9.427572	56.4	103.8
timesq	Time squared	2282.5	2039.927	1	62724

Table B

	Model #1	Model #2	Model #1a	Model #2a
R ²	0.993		0.9954	0.9999
Adjusted R ²	0.992		0.9947	0.9999
F Statistic	0		0	0
rho	0.4586261		0.5120566	0.5356622
Durbin-Watson statistic (original)	1.175719		1.377865	1.038267
Durbin-Watson statistic (transformed)	2.003249		2.008911	2.068492
ydisp#	0.1173923		0.0889463	0.1370006
	[0.0458006]*	[0.0390734]*	[0.0494755]*	[0.348015]*
wealth	0.4369806		0.3202603	0.0000536
	[0.0885076]*	[.0790328]*	[0.0000119]*	[0.0000929]*
conf	1.322852		0.7982187	0.0000939
	[.8210849]	[.7246354]	[0.0001082]*	[0.0000929]
stim	4.675355		8.253706	0.0005318
	[25.13371]	[21.43139]	[0.00332]	[0.003295]
ann	-4.090101		-3.756904	-0.0006712
	[26.3046]	[21.73456]	[.003365]	[0.0027637]
cons_13	0.67162		0.2827139	0.0000858
	[0.060528]*	[.1203597]*	[8.18e-06]*	[0.000017]*
conf_1	0.7708031		0.412298	0.0001221
	[.8553588]	[.7274635]	[0.001109]	[0.0001056]
conf_2	0.909321		0.1654419	0.0001192
	[.8340018]	[.7292919]	[0.0001088]	[0.0000744]
time			16.35859	0.0022021
		[3.209851]*		[0.000443]*
timesq			-0.0817534	-0.0000123
		[.0218518]*		[-0.00013]*
# The coefficients for Model 1a and 2a present the coefficient of the natural log of ydisp				
NB: The coefficients on <i>ann</i> represent when <i>ann</i> is marked as February 2008				
As noted in the paper, <i>ann</i> as January 2008 is also highly insignificant				

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