

The Multiplier

Intermediate Macroeconomics - UCLA - Econ 102

François Geerolf

UCLA

October 19, 2020

Section 1

Keynesian Economics

Introduction

- Opens a set of lectures on Keynesian economics.
- Neoclassical models of consumption, saving, investment, labor market = mainstream paradigm in J.M. Keynes' time.
- J.M. Keynes (1936) refers to this paradigm as “classical.”
- Teaching of classical economics is “misleading and disastrous if we attempt to apply it to the facts of experience.”

First words of the General Theory - Keynes (1936)

I have called this book the *General Theory of Employment, Interest and Money*, placing the emphasis on the prefix *general*. The object of such a title is to contrast the character of my arguments and conclusions with those of the *classical*¹ theory of the subject, upon which I was brought up and which dominates the economic thought, both practical and theoretical, of the governing and academic classes of this generation, as it has for a hundred years past. I shall argue that the postulates of the classical theory are applicable to a special case only and not to the general case, the situation which it assumes being a limiting point of the possible positions of equilibrium. Moreover, the characteristics of the special case assumed by the classical theory happen not to be those of the economic society in which we actually live, with the result that its teaching is misleading and disastrous if we attempt to apply it to the facts of experience.

Marginal Propensity to Consume - Keynes (1936)

Our normal psychological law that, when the real income of the community increases or decreases, its consumption will increase or decrease but not so fast, can, therefore, be translated—not, indeed, with absolute accuracy but subject to qualifications which are obvious and can easily be stated in a formally complete fashion—into the propositions that ΔC_w and ΔY_w have the same sign, but $\Delta Y_w > \Delta C_w$, where C_w is the consumption in terms of wage-units. This is merely a repetition of the proposition already established on p. 29 above. Let us define, then, $\frac{dC_w}{dY_w}$ as the *marginal propensity to consume*.

Multiplier (change in investment)

This quantity is of considerable importance, because it tells us how the next increment of output will have to be divided between consumption and investment. For $\Delta Y_w = \Delta C_w + \Delta I_w$, where ΔC_w and ΔI_w are the increments of consumption and investment; so that we can write $\Delta Y_w = k\Delta I_w$, where $1 - \frac{1}{k}$ is equal to the marginal propensity to consume.

Let us call k the *investment multiplier*. It tells us that, when there is an increment of aggregate investment, income will increase by an amount which is k times the increment of investment.

Section 2

On Keynes

On J.M. Keynes - Joan Robinson (1974)

In 1931, when the world crisis had produced a sharp increase in the deficit on the U.K. balance of payments, the appropriate remedy (approved as much by the unlucky Labour government as by the Bank of England) was to cut expenditure so as to balance the budget. These were the orthodox views that prevailed in the realm of public policy. In those years British orthodoxy was still dominated by nostalgia for the world before 1914. Then there was normality and equilibrium. To get back to that happy state, its institutions and its policies should be restored - keep to the gold standard at the old sterling parity, balance the budget, maintain free trade and observe the strictest laissez faire in the relations of government with industry. When Lloyd George proposed a campaign to reduce unemployment (which was then at the figure of one million or more) by expenditure on public works, he was answered by the famous "Treasury View" that there is a certain amount of saving at any moment, available to finance investment, and if the government borrows a part, there will be so much the less for industry.

On J.M. Keynes - Joan Robinson (1974)

Meanwhile the Nazis had been proving Lloyd George's point with a vengeance. It was a joke in Germany that Hitler was planning to give employment in straightening the Crooked Lake, painting the Black Forest white and putting down linoleum in the Polish Corridor. The Treasury view was that his unsound policies would soon bring him down. But the little group of Keynesians was despondent and frustrated. We were getting the theory clear at last, but it was going to be too late.

- Similarly today, the rethinking in economic thought is in great part driven by politics.
- Do politics “trump” economics?

Section 3

Interest-inelastic investment

Strong Assumption

- In the following notes, I assume that investment is interest inelastic.
- In other words, it is assumed that investment does not much depend on the cost of capital.
- In many textbooks, even Keynesian models feature a strong dependency of investment on the cost of capital $I(r)$: this is in fact what lies behind the (IS) curve.
- Only assuming a “zero-lower bound,” or the fact that interest rates can’t fall below a certain threshold, do we have a “paradox of thrift.”

Hansen (1939)

activity. Less agreement can be claimed for the rôle played by the rate of interest on the volume of investment. Yet few there are who believe that in a period of investment stagnation an abundance of loanable funds at low rates of interest is alone adequate to produce a vigorous flow of real investment. I am increasingly impressed with the analysis made by Wicksell who stressed the prospective rate of profit on new investment as the active, dominant, and controlling factor, and who viewed the rate of interest as a passive factor, lagging behind the profit rate. This view is moreover in accord with competent business judgment.¹ It is true that it is necessary to look beyond the mere *cost* of interest charges to the indirect effect of the interest rate structure upon business expectations. Yet all in all, I venture to assert that the rôle of the rate of interest as a determinant of investment has occupied a place larger than it deserves in our thinking. If this be granted, we are forced to regard the factors which underlie economic progress as the dominant determinants of investment and employment.

To go further

- In one of the last lectures of the course on theoretical controversies, we shall see that one reason why investment is not responsive to interest rates when they become low, is that “rational bubbles” can appear.
- In other words, with low interest rates, more saving does not necessarily translate into more investment, but might alternatively translate into higher asset prices instead.
- This is very different from the neoclassical, Solow growth model we saw before, in which capital accumulation depends *a lot* on the cost of capital.
- Empirically, it has been shown repeatedly that investment bears very little connection to the cost of capital. Thus, it is probably not such a strong assumption after all.

Dornbusch, Fischer (1979)

Subsequent empirical research has suggested that the accelerator model of Equation (10) — somewhat expanded — does about as good a job at explaining investment behavior as the neoclassical model.¹⁹ The accelerator model is expanded in empirical work to make the rate of investment depend not only on the change in income this period, but also on the change in income in earlier periods. In empirical applications, this simple accelerator model differs therefore from the neoclassical model mainly in that it omits the cost of capital.

At least on evidence through 1979, it seems that the cost of capital

¹⁹ Peter K. Clark, "Investment in the 1970's: Theory, Performance, and Prediction," *Brookings Papers on Economic Activity*, 1979:1 (Washington, D.C.: The Brookings Institution, 1979).

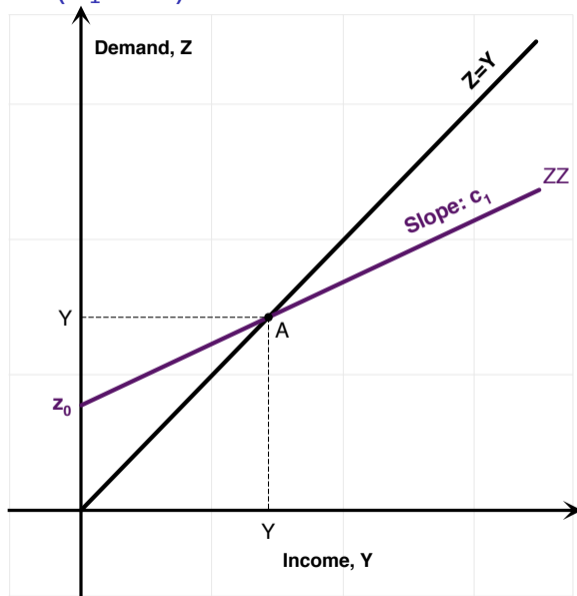
empirically does not much affect investment and that accordingly the simple accelerator model does as well as the neoclassical model at explaining investment. Events since 1979 should, though, provide a good test of whether the cost of capital affects investment. Real interest rates and the rental cost of capital were extremely high in 1981 and 1982, and the rate of investment fell sharply. Future empirical work is thus quite likely to confirm the importance of the rental cost of capital — as well as the level of output — in determining investment spending. Certainly, theory suggests that the rental cost should play an important role in affecting investment.

We now discuss some other aspects of investment behavior.

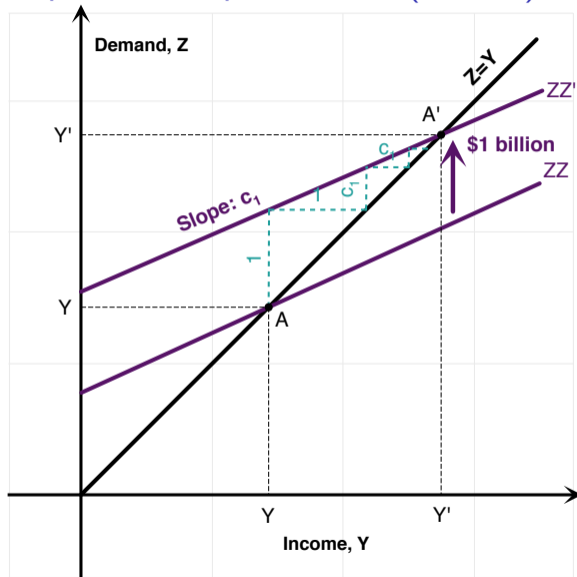
Section 4

Keynesian Crosses

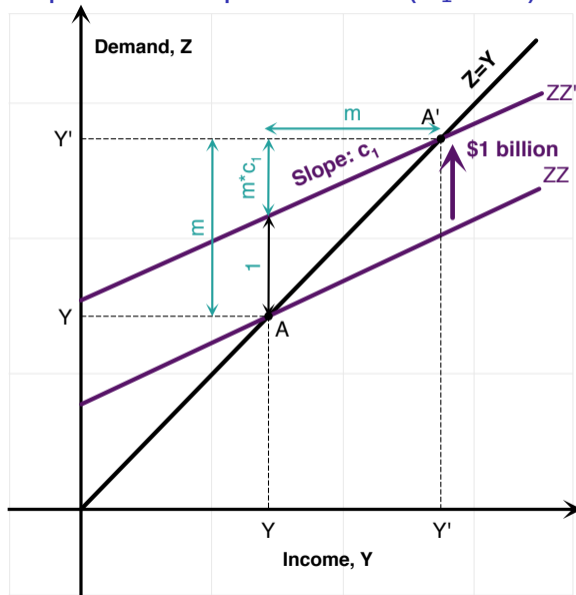
Goods Market Model ($b_1 = 0$)



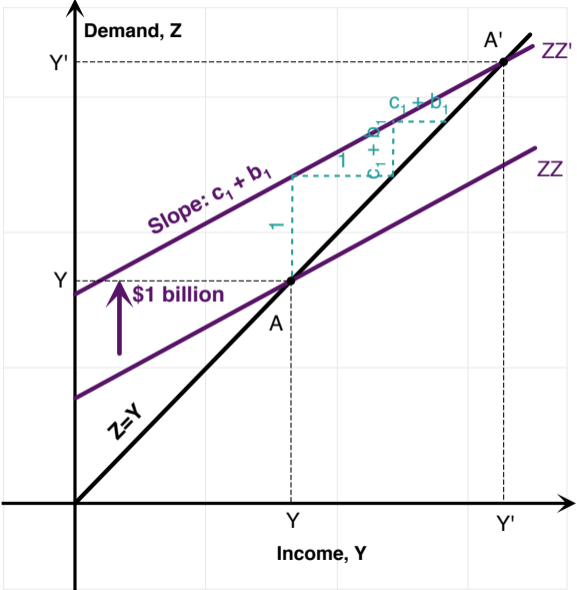
Keynesian Cross: Graphical Interpretation 1 ($b_1 = 0$)



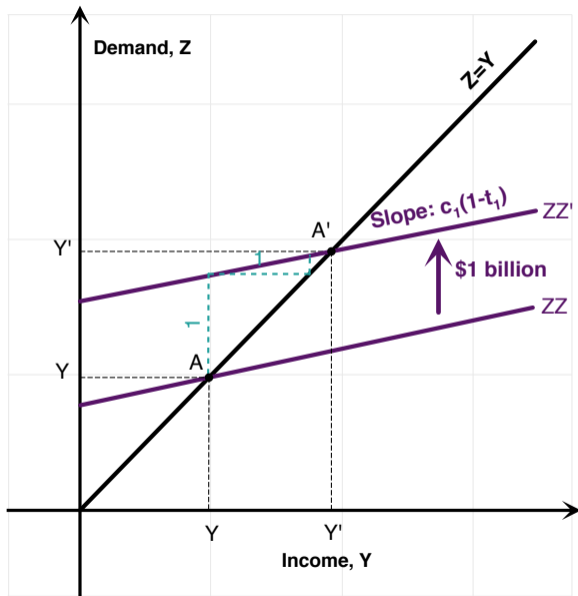
Keynesian Cross: Graphical Interpretation 2 ($b_1 = 0$)



Accelerator Effect of Investment ($b_1 \neq 0$)



Automatic Stabilizers



Section 5

Readings

Robert J. Barro - Keynes Is Still Dead.

- This article from Robert Barro dates from just before the 1992 presidential election. (Clinton was president 1993-2001)
- At the time, Keynesian economics was in decline. (the 2007-2009 financial crisis sparked a renewed interest in Keynesian economics)
- Importantly, policy-making institutions (IMF, Treasuries) have always been more inclined towards Keynesian economics, while academics, at least until recently, have taken a more skeptical approach.
- Robert Barro pushed the idea of “Ricardian equivalence”: the idea that Keynesian stimulus such as tax cuts, are ineffective because people anticipate future taxes to come, to repay the public debt.
- Barro has used it to explain the absence of the crowding-out effects of government debt, particularly following the Reagan tax cuts. Of course, as we saw, an alternative explanation is that investment is not sensitive to the cost of capital, and mainly determined by aggregate demand.

Section 6

Empirical Macro: Aggregate Studies

The Problem with Empirical Macro 1/3



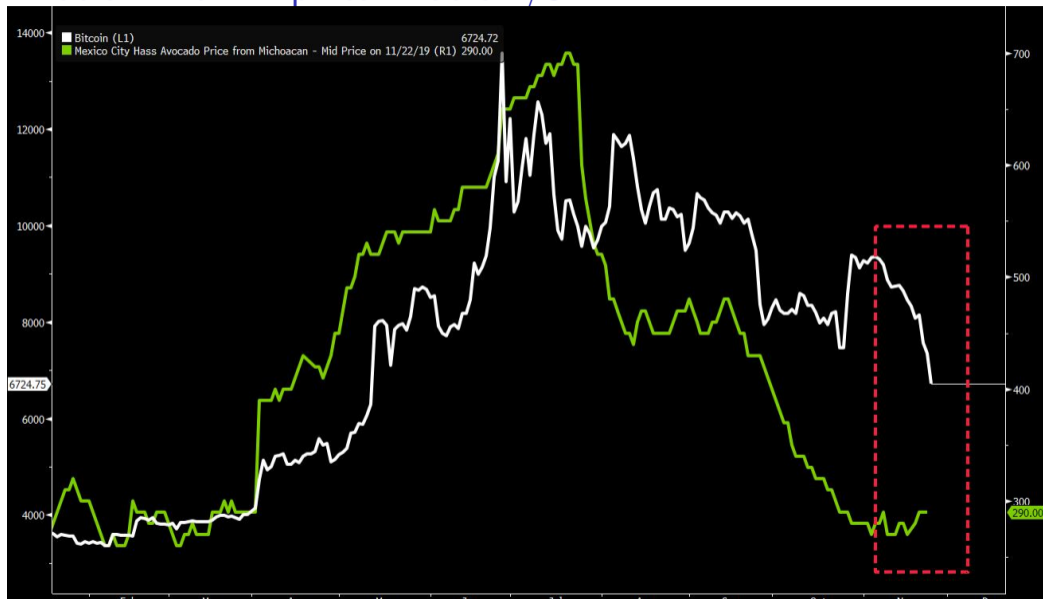
Charlie Peters  @CDP1882 · Sep 22

This week marks five years since Britney Spears released her anthem 'Work Bitch'

Since then, US unemployment has dropped from 7.2% to 3.9%

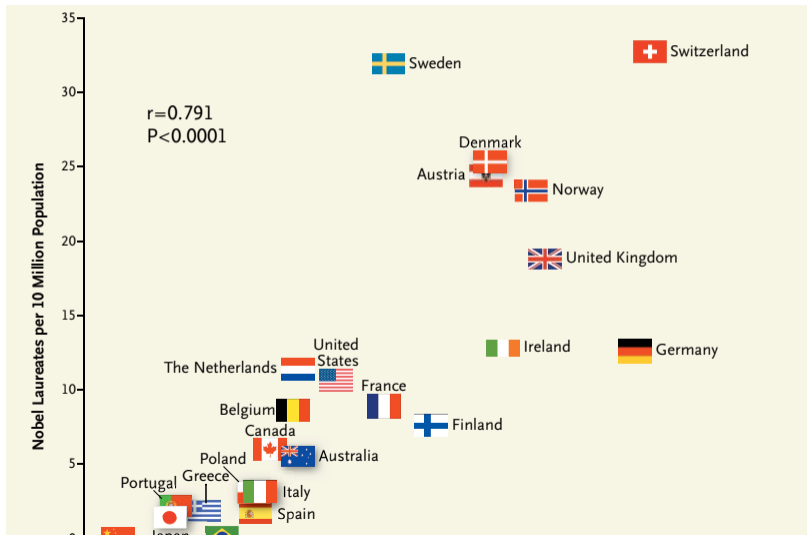


The Problem with Empirical Macro 2/3



The Problem with Empirical Macro 3/3

Messerli (2012): Nobel Laureates and Chocolate Consumption.



The Problem with Empirical Macro

Why don't we just look at what happens to GDP following a tax cut?

- 1 Many things happen in any one year:
 - September 15, 2013: Britney Spears happens to release her new song, which promotes work ethic.
 - However, other things have happened between 2013 and 2018 (including a massive tax cut plan)
- 2 Policies are changed for a reason:
 - Years where taxes are changed are different from taxes where taxes are not changed.
 - This is not like a Randomized Control Trial (RCT) in medicine: macroeconomic policies are not changed randomly.
 - For example: $\Delta G > 0$ often happens during recessions. Low subsequent GDP growth: low multipliers or because GDP growth was low to start with.

Answers

What are the potential answers?

- Add up many tax changes:
 - ▶ Some tax changes are accompanied by a new release of Britney Spears, but on average they are not.
 - ▶ Allows to control for other types of more serious events, too. (wars, etc.)
- State their motivations:
 - ▶ Taxes raised to reduce the deficit, or increase long-run incentives are “exogenous.”
 - ▶ We do not want to look at tax changes which are made for managing the business cycle, in particular.

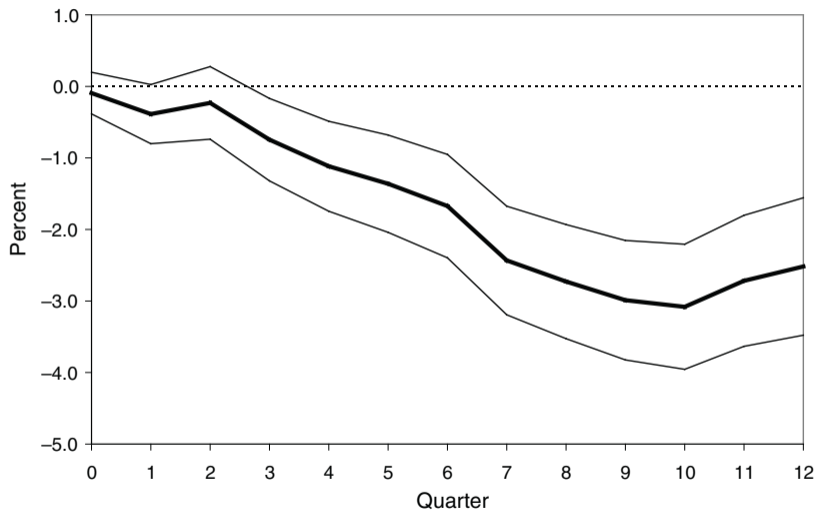
List of Tax Changes 1/2

Legislation	Year	Motiv	Type	Size
Revenue Act 1948	1948	LR	Ex.	-1.86
Social Security Amendments 1947	1950	Def	Ex.	0.26
Internal Revenue Code 1954	1954	LR	Ex.	-0.37
Social Security Amendments 1958	1960	Def	Ex.	0.36
Social Security Amendments 1961	1963	Def	Ex.	0.86
Revenue Act 1964	1964	LR	Ex.	-1.27
Social Security Amendment 1967	1971	Def	Ex.	-0.02
Revenue Act 1971	1972	LR	Ex.	-0.73
Tax Reform Act 1976	1976	LR	Ex.	0.13
Tax Reduction & Simplif. Act 1977	1977	LR	Endo.	-0.38
1972 Changes to Social Security	1978	Def	Ex.	0.13
Revenue Act 1978	1979	LR	Ex.	-0.39
Social Security Amendment 1977	1981	LR	Ex.	0.40

List of Tax Changes 2/2

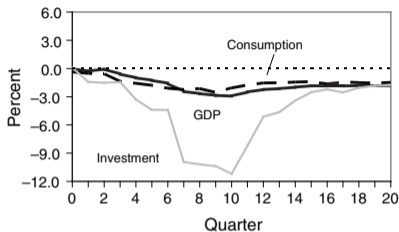
Economic Recovery Tax Act 1981	1982	LR	Ex.	-1.33
Economic Recovery Tax Act 1981	1983	LR	Ex.	-0.87
Social Security Amendments 1983	1984	Def	Ex.	-0.41
Social Security Amendments 1983	1985	Def	Ex.	0.21
Tax Reform Act 1986	1986	LR	Ex.	0.60
Tax Reform Act 1986	1987	LR	Ex.	-0.57
Social Security Amendments 1983	1988	Def	Ex.	0.37
Social Security Amendments 1983	1990	Def	Ex.	0.18
Omnibus Budget Reconc. Act 1990	1991	Def	Endo.	0.00
Omnibus Budget Reconc. Act 1993	1993	Def	Ex.	0.42
Omnibus Budget Reconc. Act 1993	1994	Def	Ex.	0.19
Econ. Gth & Tax Relief Act 2001	2002	LR	Ex.	-0.77
Jobs & Gth Tax Relief Reconc. Act 2003	2003	LR	Ex.	-1.13
Jobs & Gth Tax Relief Reconc. Act 2003	2004	LR	Endo.	0.00
Jobs & Gth Tax Relief Reconc. Act 2003	2005	LR	Ex.	0.54

Tax Increase, 1% of GDP (Romer and Romer (2010))

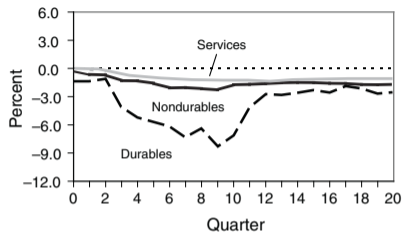


Romer and Romer (2010)

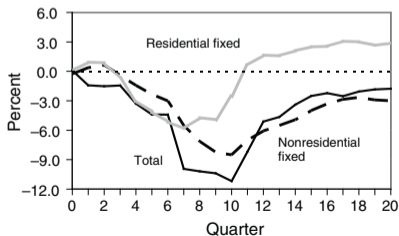
Panel A. GDP, consumption, investment



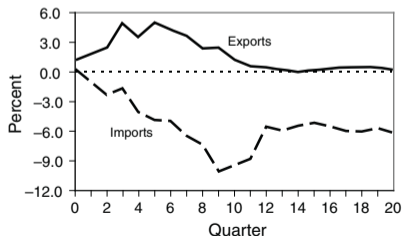
Panel B. Components of consumption



Panel C. Components of investment



Panel D. Exports and imports



Advantages and Disadvantages

Issues with these studies:

- Noisy results: multiplier is between 2 and 4.
- One cannot further decompose: e.g. Top 10% VS Bottom 90%. We would get something even noisier.
- Always worry that tax changes are endogenous. (at the aggregate level, taxes are changed for a reason)

Advantages:

- It is exactly the object of interest (national level multiplier).
- Allows to tell apart different models.

Section 7

Individual-Level Studies

Advantages and Disadvantages

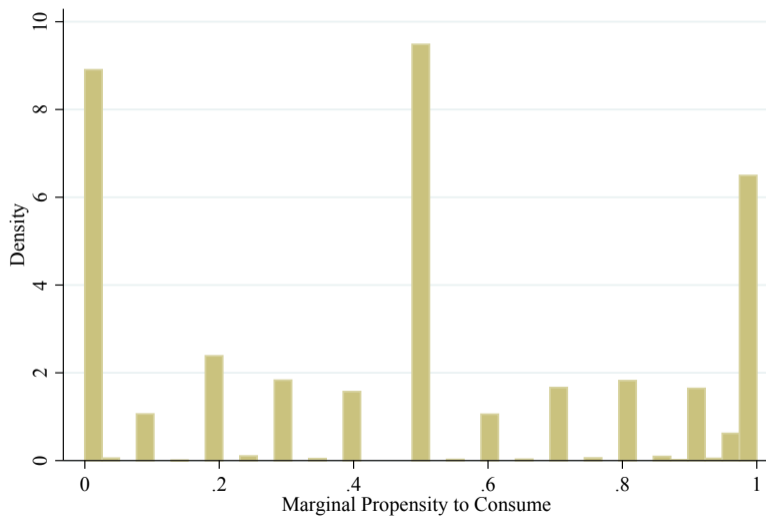
Using individual-level data like survey, fiscal, administrative, or account-level data to measure ϵ , or c_1 . Advantages:

- Many more individuals: less noisy results (more observations).
- More credible “identification”: comparing two people at the same time period.

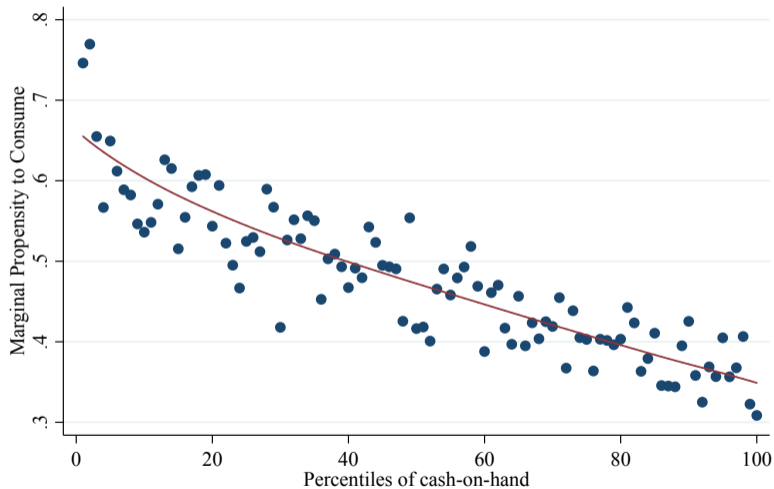
Disadvantages:

- Keynesian, aggregate demand effects cannot be estimated.
- e.g. if I decrease someone’s tax rate, then it might lead someone else to work more, not just the person who benefited from the fall in tax rates. (though the aggregate demand effect).
- Thus, there is no clean “control” group if there are aggregate demand effects.

MPC (Jappelli and Pistaferri (2014))



MPC (Jappelli and Pistaferri (2014))



Section 8

Cross-sectional Studies

Advantages and Disadvantages

Identification across zipcodes, counties, or states. Advantages:

- More observations.
- Measure Keynesian, aggregate demand, general equilibrium effects.
- Less endogenous changes than at the national level: aggregate taxes are not changed in the U.S. to target California's GDP specifically.

Disadvantages:

- Openness m_1 of a state is larger, so multiplier is lower.
- But we are interested in national level multipliers, not state level multipliers.
- We thus need economic theory in order to infer national multipliers from state multipliers.

Zidar (2019): “Tax Cuts for Whom?”

Using state-level variation in income distributions, Zidar (2019) in a *Journal of Political Economy* paper named “Tax Cuts For Whom? Heterogeneous Effects of Income Tax Changes on Growth and Employment” estimates the following effects on GDP:

- Multiplier effect of a tax cut to the bottom 90% is roughly 7.
- Multiplier effect of a tax cut to the top 10% is roughly 0.
- A tax cut going half to both groups has a multiplier of about 3.5 (Romer, Romer (2010) result).

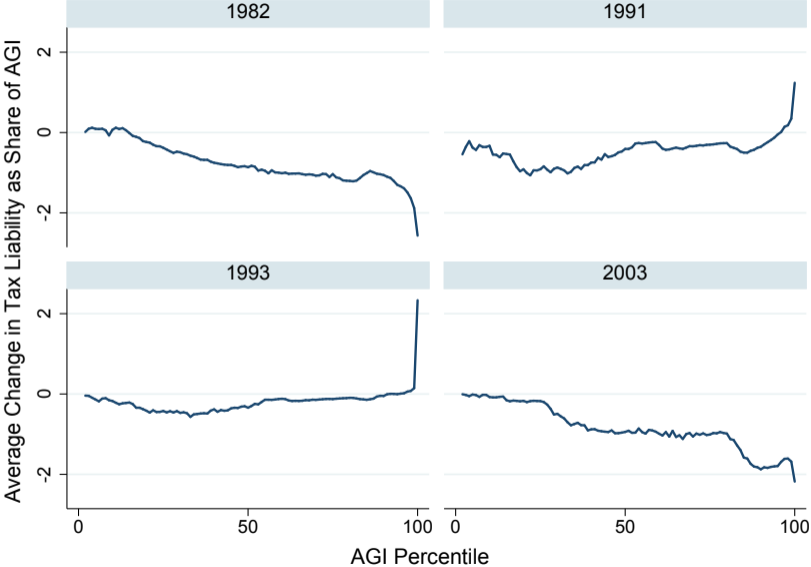
Zidar (2019): “Tax Cuts for Whom?”

Results seem to confirm our results from Lecture 9: tax cuts on bottom 90% work better than on top 10%.

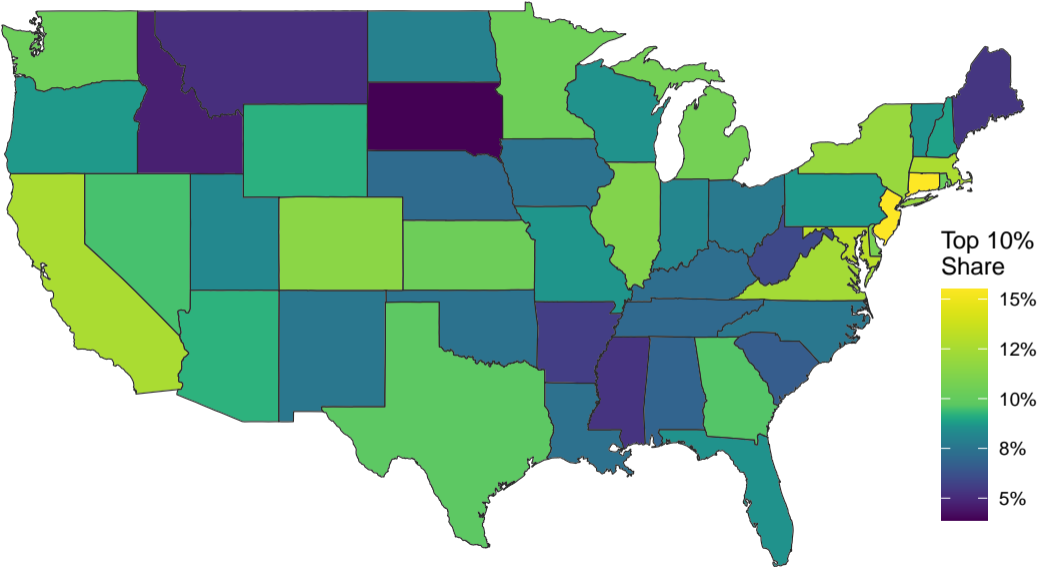
Effects on employment are similar:

- 1% of state GDP tax cut for the bottom 90% results in 3.4% employment growth over a 2-year period.
- 1% of state GDP tax cut for the top 10% is 0.2% and statistically insignificant.

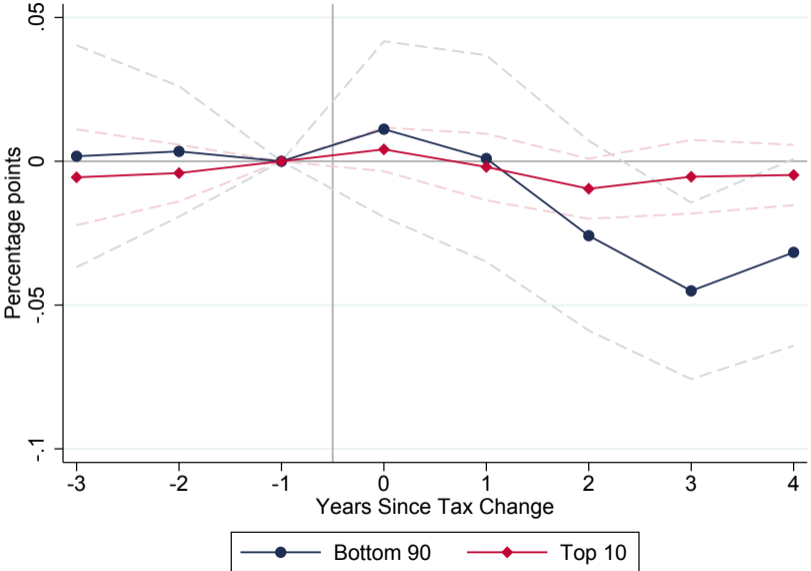
Zidar (2019)



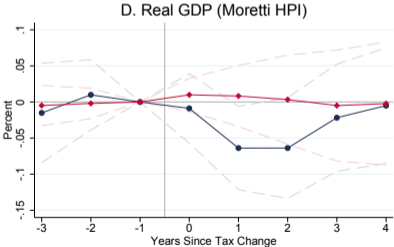
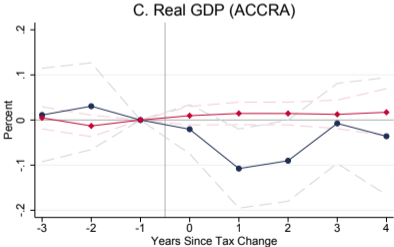
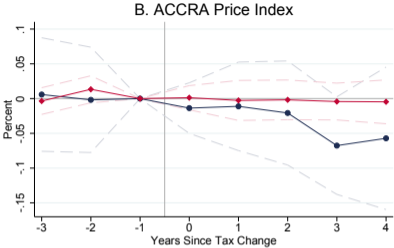
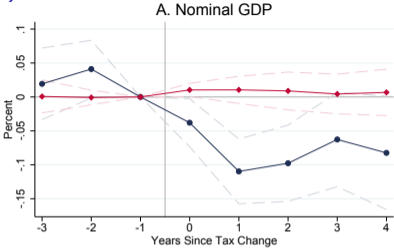
Zidar (2019)

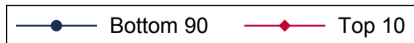
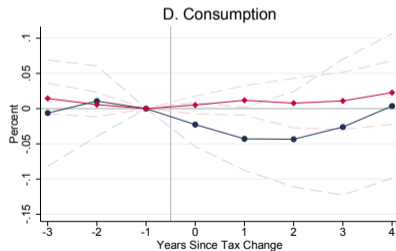
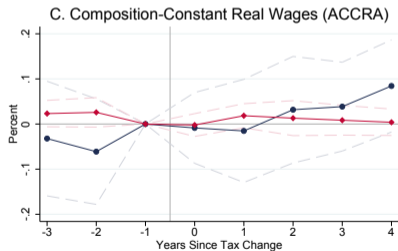
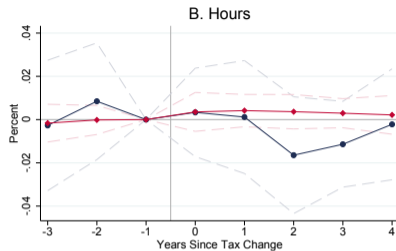
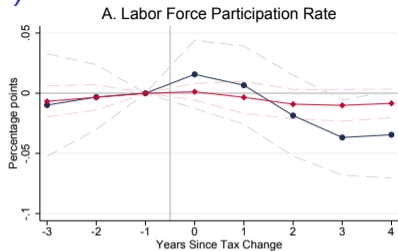


Zidar (2019)



Zidar (2019)





Section 9

Conclusion

Additional Watching (Not Required)

```
# [1] "Link to the video:"  
# [1] "econ102/empirical-macro.html"  
# [1] "or: https://vimeo.com/282850449"
```

Taking Stock

- Value of the Keynesian multiplier is still subject to very intense debates.
- Tax-based multipliers $>$ government spending multipliers (because tax changes are more persistent?)
- Tax-based multipliers could be as high as 3.
- Evidence that tax changes have long-term effect. There is a paradox of thrift.
- My view: the evidence is more supportive of the Keynesian model, than of the neoclassical model.
- Disclaimer: not everyone agrees with that view, and you are perfectly free to disagree too!

Section 10

Bibliography

- Hansen, Alvin H. 1939. "Economic Progress and Declining Population Growth." *The American Economic Review* 29 (1): 1–15. <http://www.jstor.org/stable/1806983>.
- Jappelli, Tullio, and Luigi Pistaferri. 2014. "Fiscal Policy and MPC Heterogeneity." *American Economic Journal: Macroeconomics* 6 (4): 107–36. <https://doi.org/10.1257/mac.6.4.107>.
- Keynes, John Maynard. 1936. *The General Theory of Employment, Interest, and Money*.
- Romer, Christina D., and David H. Romer. 2010. "The Macroeconomic Effects of Tax Changes: Estimates Based on a New Measure of Fiscal Shocks." *American Economic Review* 100 (3): 763–801. <https://doi.org/10.1257/aer.100.3.763>.
- Zidar, Owen. 2019. "Tax Cuts for Whom? Heterogeneous Effects of Income Tax Changes on Growth and Employment." *Journal of Political Economy* 127 (3): 1437–72. <https://doi.org/10.1086/701424>.