

# Intro to Empirical Macro; National Accounting

## Intermediate Macroeconomics - UCLA - Econ 102

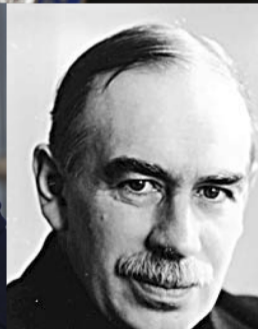
François Geerolf

UCLA

October 5, 2020

# Section 1

## Presentation



# Welcome to Econ 102

- Econ 102: Macroeconomic Theory. (*Intermediate Macroeconomics* in most places)
- Mondays and Wednesdays, 9:30-10:45am.
- 18 lectures, including this one - 1 Midterm (I think), 1 Day Off (Veterans' Day on Nov 11)
- Haines Hall, Room 39.
- **Office hours:** Mondays-Wednesdays, 10:45am-11:45pm (Zoom), **right after class.**
- Lectures are recorded.

# Exams

- There is no textbook for this class.
- There are slides, class notes, problem sets, readings, movie clips.
- Everything that I say in class is potentially examinable. It is important that you listen to class.
- “Required Readings” are also potentially examinable, so you need to read those.

# Dates

Please mark the following dates in your calendar:

- ① Monday, November 9, 2020 - 9:30 AM - 10:45 AM: Midterm Exam.
- ② Monday, December 14, 2020 - 8:00 AM - 11:00 AM: Final Exam.

# Grading Schemes

There are two available grading schemes:

- Scheme 1: **Homeworks (10%) + Midterm (20%) + Final Exam (70%)**
- Scheme 2: **Homeworks (10%) + Midterm (35%) + Final Exam (55%)**

# Homeworks

- 5 homeworks, to hand in before Monday on Week 3, Week 4, Week 7, Week 8, and Week 10.
- Homeworks will be given on Wednesdays after the lecture (Week 2, Week 3, Week 6, Week 7, Week 9)
- Graded on P/NP basis.
- Need to be submitted to your respective TAs before Monday lectures.



# Body of “Knowledge”

- Intermediate-level treatment of macroeconomic topics.
- Economic growth, business cycle fluctuations, open-economy.

## Calendar 1/3

- Oct 05. Lecture 1 - Introduction to Empirical Macro; National Accounting.
- Oct 07. Lecture 2 - Consumption and Saving.
- Oct 12. Lecture 3 - Investment.
- Oct 14. Lecture 4 - The Paradox of Thrift.
- Oct 19. Lecture 5 - The Multiplier.
- Oct 21. Lecture 6 - The Labor Market and Unemployment.
- Oct 26. Lecture 7 - Redistributive Policies.
- Oct 28. Lecture 8 - Open Economy.

## Calendar 2/3

- Nov 02. Lecture 9 -  $r-g$ , Savings Glut.
- Nov 04. Lecture 10 - Pensions; Overlapping Generations.
- **Nov 09. Midterm.**
- Nov 11. **Veteran's Day (No Class).**
- Nov 16. Lecture 11 - Asset Pricing, Bubbles, Financial Markets.
- Nov 18. Lecture 12 - Public Debt.
- Nov 23. Lecture 13 - Inflation, Monetary Policy.
- Nov 25. Lecture 14 - Phillips Curve.

## Calendar 3/3

- Nov 30. Lecture 15 - Exchange Rate Regimes.
- Dec 02. Lecture 16 - Competitiveness and Productivity.
- Dec 07. Lecture 17 - A Macroeconomic History of the U.S, Japan and Germany.
- Dec 09. Lecture 18 - 2007 - 09 Financial Crisis.

## Is economics a science ?

- I come from the hard sciences (physics in particular). Economics is not a hard science. Hence, you should take everything I teach with a grain of salt. (!!)
- Economics and politics are intertwined. You are strongly encouraged to voice your disagreement & your concerns. It's sometimes hard to distinguish facts from opinion.

# [1] "Link to the gif:"

# [1] "<https://fgeerolf.com/bib/econ102/just-your-opinion.gif>"

# Opinionated

- It's not just me. Generally, economists know much less than they pretend.
- Many issues are disputed: public debt, the causes of unemployment, trade imbalances, etc.
- I want to teach you modes of reasoning, more than answers.

## Joan Robinson (1903-1983)'s Warning



The purpose of studying economics is not to acquire a set of ready-made answers to economic questions, but to learn how to avoid being deceived by economists.

— *Joan Robinson* —

AZ QUOTES

## Macroeconomics is hard to teach

- Why is macroeconomics so hard to teach?, *The Economist*, August 11, 2018. [Link 1](#) / [Link 2](#)
- I will be emphasizing both what we know and what we don't know for sure.

**The Economist** August 11th 2018

# Free exchange | Mangonomics

## Why is macroeconomics so hard to teach?




# Macroeconomics is hard to teach

From *The Economist*:

- Macroeconomics is difficult to teach partly because its theorists (classical, Keynesian, monetarist, New Classical and New Keynesian, among others) disagree about so much.
- It is difficult also because the **textbooks disagree about so little**. To reach the widest possible audience, most cover similar material: a miscellany of models that are not always consistent with each other or even with themselves.
- The result is that many professors must teach things they do not believe.

## Churchill's joke



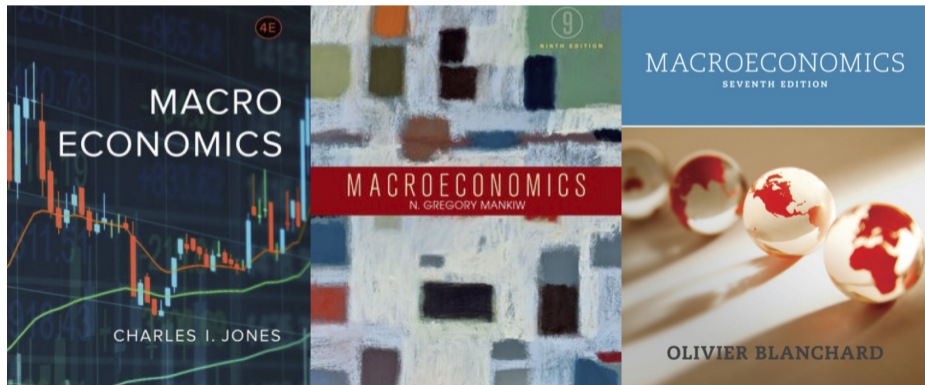
If you put two economists in a room, you get two opinions, unless one of them is Lord Keynes, in which case you get three opinions.

— *Winston Churchill* —

AZ QUOTES

## Well-known textbooks

- If you look at previous editions of these lectures / exams, you'll see that I have used different textbooks.
- In 2015-2016 i've used Charles Jones' *Macroeconomics* textbook.
- In 2018, I used Olivier Blanchard's *Macroeconomics* textbook.



## Mankiw (2018)

- N. Gregory Mankiw (2018), Six guidelines for teaching intermediate macroeconomics, *The Journal of Economic Education*.

### **Guideline number 1: Suppress your idiosyncrasies**

When teaching a required course for economics majors, such as a principles course or an intermediate course, the professor should embrace the role of being an ambassador for the economics profession. The students are not there to learn your particular views of how the economy works. They are there to learn the foundational ideas that have been broadly established and accepted.

As a result, if your views differ substantially from the consensus, your obligation is to suppress your idiosyncrasies. For example, you may passionately believe that the business cycle is driven by exogenous shocks to technology, that monetary policy has no real effects, and that observed fluctuations are Pareto-optimal intertemporal responses that can never be improved by any sort of policy. If so, you should keep this opinion to yourself when you enter the classroom to teach intermediate macroeconomics. Most of your colleagues in the economics profession have a very different view about the business cycle. And your students are better off learning the professional consensus than your idiosyncratic perspective.

My sense is that most teachers of intermediate macro follow this guideline. The four best-selling texts for this course—mine, Blanchard, Jones, and Abel, Bernanke, and Croushore – all present a synthesis view that includes a classical long run and a Keynesian short run. To be sure, each of these books takes students on a somewhat different pedagogical journey, but the books share a common destination. Students leave the course with a solid understanding of the current consensus among macroeconomists.

# Main “schools of thought”

- Mankiw mentions two schools of thought:
  - ▶ The **Real Business Cycle** View - everything is determined by supply “you may passionately believe that the business cycle is driven by exogenous shocks to technology,” which he strongly rejects.
  - ▶ The New-Keynesian, “synthesis,” view - “aggregate demand” matters for the short-run (where the economy is Keynesian), but neoclassical forces dominate in the long run. He argues in favor of teaching that.
- On my side, I lean towards a **third school of thought**, which argues that aggregate demand might actually matter even for the long run (it is the mirror image view, compared to that which argues that everything is determined by supply).
- I have worked on this very intensely since I started my ph.D. in 2010 and defended my dissertation in July 2013 entitled “Bubbles and Asset Supply.” The first chapter argued that there was an excess of savings over investment in the world.

## My teaching and my research

- My own research has made me a little bit more original in my views than your usual instructor in macroeconomics: I am a Keynesian, but I am not a new-Keynesian.
- Although, I am not alone: Larry Summers, for example, is a well-known defender of the secular stagnation views that I'll be teaching in this course. The reason why I teach that is because I believe they explain the world much better.
- In **November 2013** Larry Summers, at the IMF Fourteenth Annual Research Conference in Honor of Stanley Fischer, argued forcefully in favor of “secular stagnation,” or the idea of an excess of savings over investment.
- I will not only be teaching my “pet” theories I've worked on since my Ph.D. thesis, but I'll also be teaching the more standard theories, so that you know how to read the press, as well as the problems that come with these theories.

# Olivier Blanchard in August 2008

“The state of macro is good.”

## The State of Macro

Olivier J. Blanchard

**NBER Working Paper No. 14259**

**Issued in August 2008**

**NBER Program(s): Economic Fluctuations and Growth**

For a long while after the explosion of macroeconomics in the 1970s, the field looked like a battlefield. Over time however, largely because facts do not go away, a largely shared vision both of fluctuations and of methodology has emerged. Not everything is fine. Like all revolutions, this one has come with the destruction of some knowledge, and suffers from extremism and herding. None of this deadly however. The state of macro is good.

## September 15, 2008: Lehman Brothers

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# [1] "Link to the video:"  
# [1] "econ102/intro-macro.html"
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# HOW DID ECONOMISTS GET IT SO WRONG?

The Great Recession was the result not only of lax regulation in Washington and reckless risk-taking on Wall Street but also of faulty theorizing in academia. Can economists learn from their mistakes?

BY PAUL KRUGMAN

## I. MISTAKING BEAUTY FOR TRUTH

It's hard to believe now, but not long ago economists were congratulating themselves over the success of their field. Those successes — or so they believed — were both theoretical and practical, leading to a golden era for the profession. On the theoretical side, they thought that they had resolved their internal disputes. Thus, in a 2008 paper titled “The State of Macro” (that is, macroeconomics, the study of big-picture issues like recessions), Olivier Blanchard of M.I.T., now the chief economist at the International Monetary Fund, declared that “the state of macro is good.” The battles of yesteryear, he said, were over, and there had been a “broad convergence of vision.” And in the real world, economists believed they had things under control: the “central problem of depression-prevention has been solved,” declared Robert Lucas of the

University of Chicago in his 2003 presidential address to the American Economic Association. In 2004, Ben Bernanke, a former Princeton professor who is now the chairman of the Federal Reserve Board, celebrated the Great Moderation in economic performance over the previous two decades, which he attributed in part to improved economic policy making.

Last year, everything came apart.

Few economists saw our current crisis coming, but this predictive failure was the least of the field's problems. More important was the profession's blindness to the very possibility of catastrophic failures in a market economy. During the golden years, financial economists came to believe that markets were inherently stable — indeed, that stocks and other assets were always priced just right. There was nothing in

the prevailing models suggesting the possibility of the kind of collapse that happened last year. Meanwhile, macroeconomists were divided in their views. But the main division was between those who insisted that free-market economies never go astray and those who believed that economies may stray now and then but that any major deviations from the path of prosperity could and would be corrected by the all-powerful Fed. Neither side was prepared to cope with an economy that went off the rails despite the Fed's best efforts.

And in the wake of the crisis, the fault lines in the economics profession have yawned wider than ever. Lucas says the Obama administration's stimulus plans are “schlock economics,” and his Chicago colleague John Cochrane says they're based on discredited “fairy tales.” In response,

# Sept 09: How did economists get it so wrong?



## Sept 09: How did economists get it so wrong?



# HOW DID PAUL KRUGMAN GET IT SO WRONG?<sup>1</sup>

John H. Cochrane

*This article is a response to Paul Krugman's New York Times Magazine article, 'How Did Economists Get It So Wrong?' Krugman's attack on modern economics – and many ad hominem attacks on modern economists – display a deep and highly politicised ignorance of what economics and finance is really all about, and a striking emptiness of useful ideas.*

**Keywords:** Paul Krugman, stimulus, Keynes, efficient markets.

# 2011 - John Cochrane's response

Many friends and colleagues have asked me what I think of Paul Krugman's *New York Times Magazine* article, 'How Did Economists Get It So Wrong?'<sup>22</sup>

Most of all, it is sad. Imagine this were not an economics article. Imagine this were a respected scientist turned popular writer, who says, most basically, that everything everyone has done in his field since the mid-1960s is a complete waste of time. Everything that fills its academic journals, is taught in its PhD programmes, presented at its conferences, summarised in its graduate textbooks, and rewarded with the accolades a profession can bestow (including multiple Nobel Prizes) is totally wrong. Instead, he calls for a return to the eternal verities of a rather convoluted book written in the 1930s, as taught to our author in his undergraduate introductory courses. If a scientist, he might be an AIDS-HIV disbeliever,

a creationist or a stalwart that maybe continents do not move after all.

It gets worse. Krugman hints at dark conspiracies, claiming 'dissenters are marginalised'. The list of enemies is ever-growing and now includes 'new Keynesians' such as Olivier Blanchard and Greg Mankiw. Rather than source professional writing, he uses out-of-context second-hand quotes from media interviews. He even implies that economists have adopted ideas for pay, selling out for 'sabbaticals at the Hoover institution' and fat 'Wall Street paychecks'.

This approach to economic discourse is a disservice to *New York Times* readers. They depend on Krugman to read real academic literature and digest it, and they get this attack instead. Any astute reader knows that personal attacks and innuendo mean the author has run out of ideas.

Indeed, this is the biggest and saddest news of this piece: Paul Krugman has no interesting ideas whatsoever about what caused the financial and economic problems that culminated in the crash of 2008, what policies might have prevented it, or what might help us in the future.

But maybe he is right. Occasionally sciences, especially social sciences, do take a wrong turn for a decade or two. I think Keynesian economics was such a wrong turn. So let us take a quick look at the ideas.

Krugman's attack has two goals. First, he thinks financial markets are 'inefficient', fundamentally due to 'irrational' investors, and thus prey to excessive volatility which needs government control. Second, he likes the huge 'fiscal stimulus' provided by multi-trillion dollar deficits.

## Market efficiency

It is fun to say that we did not see the crisis coming, but the central empirical prediction of the efficient markets hypothesis is precisely that nobody can tell where markets are going – neither benevolent government bureaucrats, nor crafty hedge-fund managers, nor ivory-tower academics. This is probably the best-tested proposition in all the social sciences. Krugman knows this, so all he can do is rehash his dislike for a theory whose central prediction is that nobody can be a reliable soothsayer. It makes no sense whatsoever to try to discredit efficient market theory in finance because its followers didn't see the crash coming.

Krugman writes as if the volatility of stock prices alone disproves market efficiency, and believers in efficient market makers have just

## Mainstream views of macroeconomics

- In the past, I've taught *Intermediate Macroeconomics* 2 times using Charles I. Jones' textbook (Winter 2015, Winter 2016), once using Blanchard textbook (Spring 2018).
- Since Fall 2018, I've started using my own material. However, I will try to follow Greg Mankiw's guidelines and be an "ambassador for the economics profession." I will tell you when what I teach you is not exactly mainstream.
- In particular, I disagree with the sticky price interpretation of Keynesian economics, and do not believe in the Phillips curve. This view is taught in both Greg Mankiw's textbook as well as in Olivier Blanchard's.
- Cost of the class is very low: simply buying "The Big Short" movie. (required for the class)
- To illustrate this debate, I will now spend some time on how macroeconomists distinguish "cycles from trends" in macroeconomic time series.

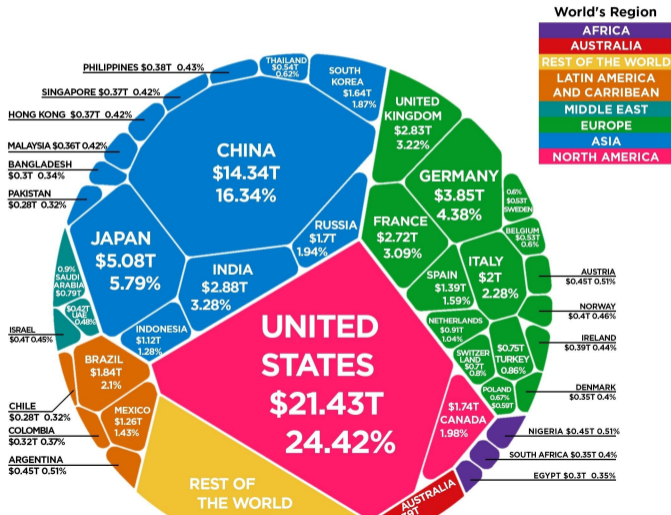
## Section 2

### Cycles and Trends

World GDP = \$ 80 Tn

# The World Economy

## Gross Domestic Product (GDP) by Country 2019



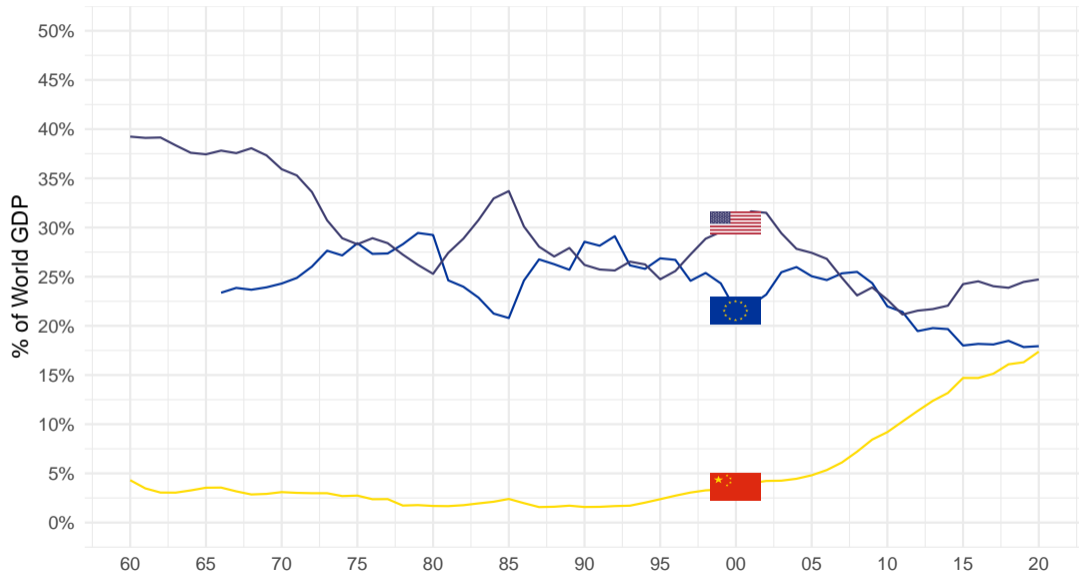


Rank	iso2c	Iso2c	GDP (Bn)	Cumul.	Rank	iso2c	Iso2c	GDP (Bn)	Cumul.	Rank	iso2c	Iso2c	GDP (Bn)	Cumul.
1	US	United States	\$ 17856 Bn	21.6 %	26	NG	Nigeria	\$ 469 Bn	83.6 %	51	KZ	Kazakhstan	\$ 204 Bn	93.3 %
2	CN	China	\$ 10797 Bn	34.6 %	27	AR	Argentina	\$ 447 Bn	84.2 %	52	DZ	Algeria	\$ 201 Bn	93.5 %
3	JP	Japan	\$ 6190 Bn	42.1 %	28	AT	Austria	\$ 443 Bn	84.7 %	53	BD	Bangladesh	\$ 194 Bn	93.8 %
4	DE	Germany	\$ 3937 Bn	46.9 %	29	TH	Thailand	\$ 442 Bn	85.2 %	54	VN	Vietnam	\$ 188 Bn	94 %
5	FR	France	\$ 2925 Bn	50.4 %	30	ZA	South Africa	\$ 430 Bn	85.7 %	55	NZ	New Zealand	\$ 186 Bn	94.2 %
6	GB	United Kingdom	\$ 2881 Bn	53.9 %	31	VE	Venezuela, RB	\$ 421 Bn	86.3 %	56	QA	Qatar	\$ 176 Bn	94.4 %
7	IN	India	\$ 2842 Bn	57.3 %	32	AE	United Arab Emirates	\$ 393 Bn	86.7 %	57	HU	Hungary	\$ 163 Bn	94.6 %
8	BR	Brazil	\$ 2310 Bn	60.1 %	33	CO	Colombia	\$ 382 Bn	87.2 %	58	KW	Kuwait	\$ 137 Bn	94.8 %
9	IT	Italy	\$ 2141 Bn	62.7 %	34	MY	Malaysia	\$ 382 Bn	87.7 %	59	UA	Ukraine	\$ 131 Bn	95 %
10	CA	Canada	\$ 1905 Bn	65 %	35	IE	Ireland	\$ 373 Bn	88.1 %	60	MA	Morocco	\$ 123 Bn	95.1 %
11	RU	Russian Federation	\$ 1722 Bn	67.1 %	36	DK	Denmark	\$ 370 Bn	88.5 %	61	SK	Slovak Republic	\$ 112 Bn	95.3 %
12	ES	Spain	\$ 1540 Bn	69 %	37	SG	Singapore	\$ 328 Bn	88.9 %	62	AO	Angola	\$ 100 Bn	95.4 %
13	AU	Australia	\$ 1421 Bn	70.7 %	38	PH	Philippines	\$ 322 Bn	89.3 %	63	EC	Ecuador	\$ 89 Bn	95.5 %
14	KR	Korea, Rep.	\$ 1382 Bn	72.4 %	39	IL	Israel	\$ 309 Bn	89.7 %	64	PR	Puerto Rico	\$ 87 Bn	95.6 %
15	MX	Mexico	\$ 1313 Bn	73.9 %	40	HK	Hong Kong SAR, China	\$ 289 Bn	90.1 %	65	LK	Sri Lanka	\$ 85 Bn	95.7 %
16	TR	Turkey	\$ 1240 Bn	75.4 %	41	EG	Egypt, Arab Rep.	\$ 286 Bn	90.4 %	66	MM	Myanmar	\$ 84 Bn	95.8 %
17	ID	Indonesia	\$ 1147 Bn	76.8 %	42	CL	Chile	\$ 283 Bn	90.7 %	67	DO	Dominican Republic	\$ 82 Bn	95.9 %
18	NL	Netherlands	\$ 948 Bn	78 %	43	FI	Finland	\$ 269 Bn	91.1 %	68	SD	Sudan	\$ 78 Bn	96 %
19	SA	Saudi Arabia	\$ 702 Bn	78.8 %	44	PK	Pakistan	\$ 254 Bn	91.4 %	69	UZ	Uzbekistan	\$ 78 Bn	96.1 %
20	CH	Switzerland	\$ 675 Bn	79.6 %	45	GR	Greece	\$ 253 Bn	91.7 %	70	CU	Cuba	\$ 77 Bn	96.2 %
21	PL	Poland	\$ 633 Bn	80.4 %	46	CZ	Czech Republic	\$ 248 Bn	92 %	71	OM	Oman	\$ 76 Bn	96.3 %
22	SE	Sweden	\$ 590 Bn	81.1 %	47	PT	Portugal	\$ 247 Bn	92.3 %	72	LU	Luxembourg	\$ 67 Bn	96.3 %
23	IR	Iran, Islamic Rep.	\$ 561 Bn	81.8 %	48	RO	Romania	\$ 225 Bn	92.6 %	73	HR	Croatia	\$ 65 Bn	96.4 %
24	BE	Belgium	\$ 539 Bn	82.5 %	49	IQ	Iraq	\$ 211 Bn	92.8 %	74	BY	Belarus	\$ 64 Bn	96.5 %
25	NO	Norway	\$ 489 Bn	83 %	50	PE	Peru	\$ 206 Bn	93.1 %	75	ET	Ethiopia	\$ 62 Bn	96.6 %

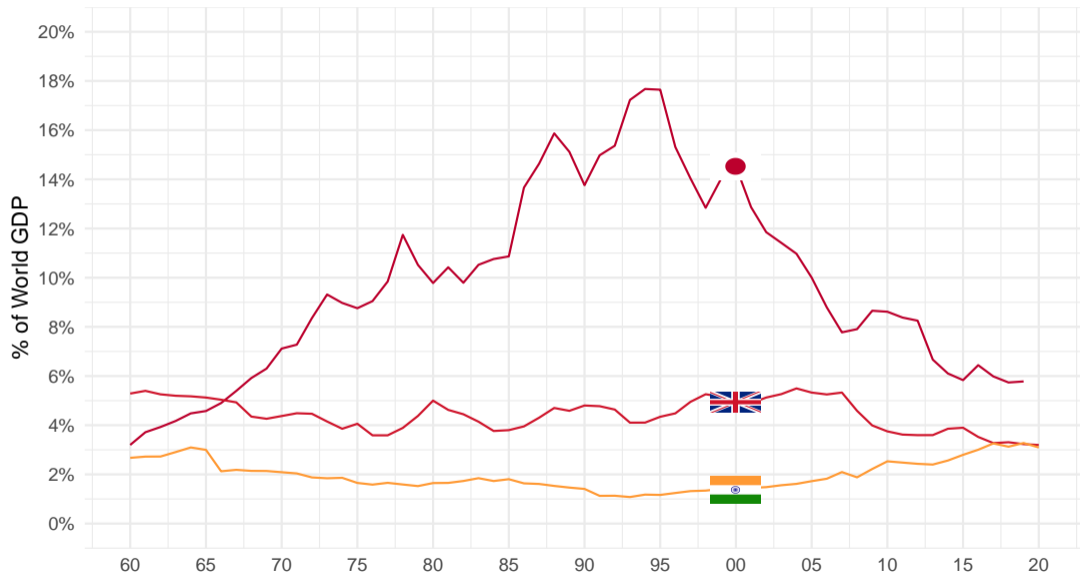
# GDP Per Capita

iso2c	Iso2c	GDP/Person	iso2c	Iso2c	GDP/Person	iso2c	Iso2c	GDP/Person
MC	Monaco	\$ 195880	DE	Germany	\$ 47478	BH	Bahrain	\$ 21438
LI	Liechtenstein	\$ 141200	BE	Belgium	\$ 47166	TC	Turks and Caicos Islands	\$ 21028
LU	Luxembourg	\$ 110742	AD	Andorra	\$ 44570	SA	Saudi Arabia	\$ 20820
NO	Norway	\$ 92078	FR	France	\$ 43664	SK	Slovak Republic	\$ 20599
IM	Isle of Man	\$ 90191	GB	United Kingdom	\$ 43325	EE	Estonia	\$ 19954
BM	Bermuda	\$ 79252	AE	United Arab Emirates	\$ 40782	MP	Northern Mariana Islands	\$ 18578
CH	Switzerland	\$ 79214	HK	Hong Kong SAR, China	\$ 38782	LT	Lithuania	\$ 17709
IE	Ireland	\$ 76881	NZ	New Zealand	\$ 37997	KN	St. Kitts and Nevis	\$ 16943
KY	Cayman Islands	\$ 76285	IT	Italy	\$ 35432	PL	Poland	\$ 16659
DK	Denmark	\$ 63873	IL	Israel	\$ 34746	HU	Hungary	\$ 16648
QA	Qatar	\$ 63261	KW	Kuwait	\$ 33112	LV	Latvia	\$ 16269
MO	Macao SAR, China	\$ 58642	ES	Spain	\$ 32950	BB	Barbados	\$ 16018
SG	Singapore	\$ 58248	CY	Cyprus	\$ 31508	HR	Croatia	\$ 15890
SE	Sweden	\$ 57921	GU	Guam	\$ 31477	OM	Oman	\$ 15797
AU	Australia	\$ 56842	BN	Brunei Darussalam	\$ 31437	TT	Trinidad and Tobago	\$ 15161
NL	Netherlands	\$ 55023	VI	Virgin Islands (U.S.)	\$ 29291	AG	Antigua and Barbuda	\$ 15135
US	United States	\$ 54579	MT	Malta	\$ 28594	CL	Chile	\$ 15130
SM	San Marino	\$ 53338	PR	Puerto Rico	\$ 27341	TR	Turkey	\$ 15069
IS	Iceland	\$ 52103	BS	Bahamas, The	\$ 27261	UY	Uruguay	\$ 14617
CA	Canada	\$ 51392	SI	Slovenia	\$ 26768	SC	Seychelles	\$ 14385
AT	Austria	\$ 50020	KR	Korea, Rep.	\$ 26762	VE	Venezuela, RB	\$ 14025
GL	Greenland	\$ 49310	AW	Aruba	\$ 24485	PW	Palau	\$ 12260
JP	Japan	\$ 48920	PT	Portugal	\$ 23995	MY	Malaysia	\$ 12120
FI	Finland	\$ 48749	GR	Greece	\$ 23558	RU	Russian Federation	\$ 11729

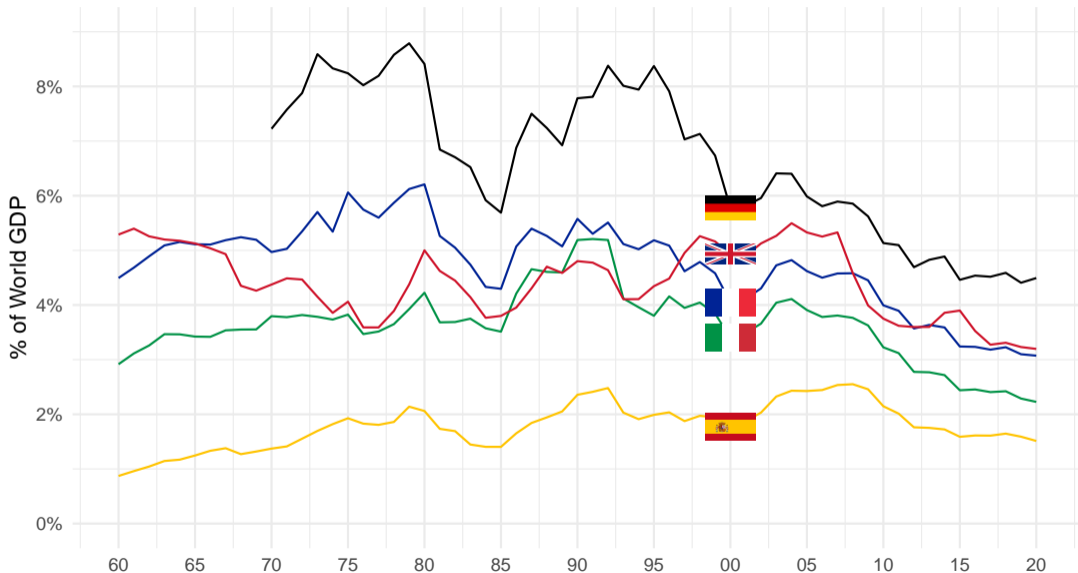
# U.S., Europe, China



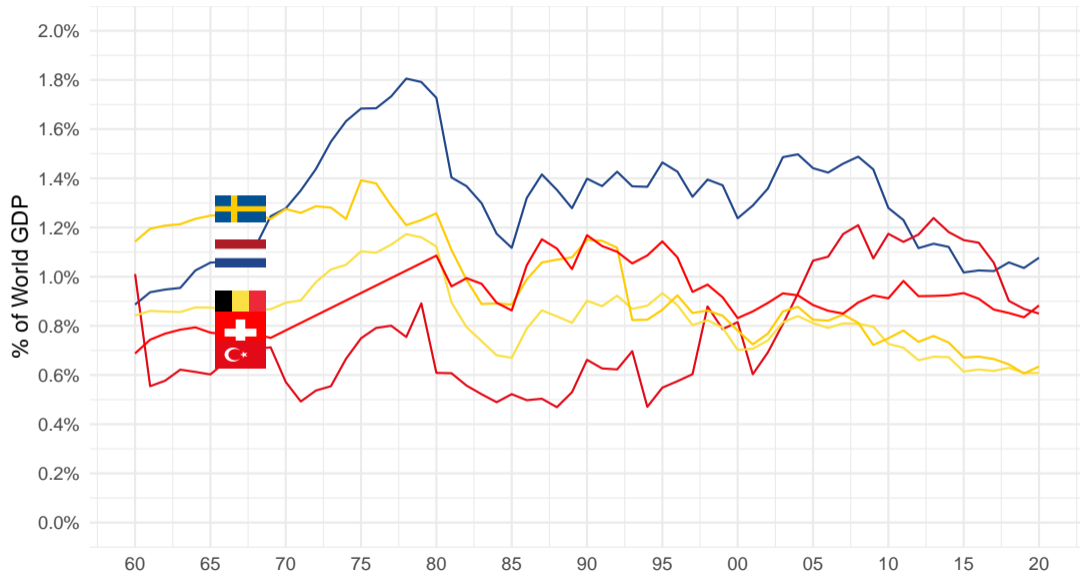
# Japan, India, United Kingdom



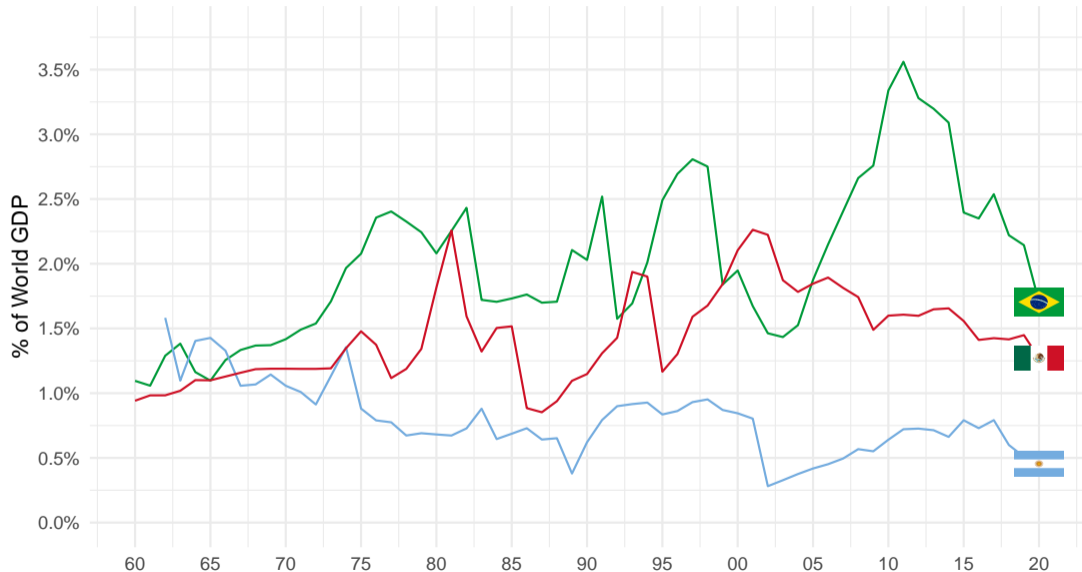
# Germany, France, Italy, Spain, UK



# Netherlands, Belgium, Switzerland, Turkey, Poland, Sweden

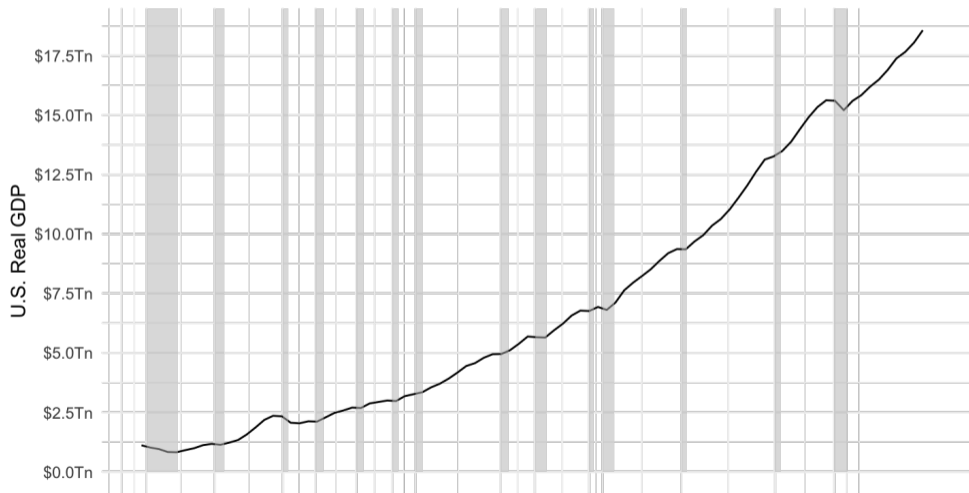


# Brazil, Mexico, Argentina



# U.S. Real GDP (1929-2019)

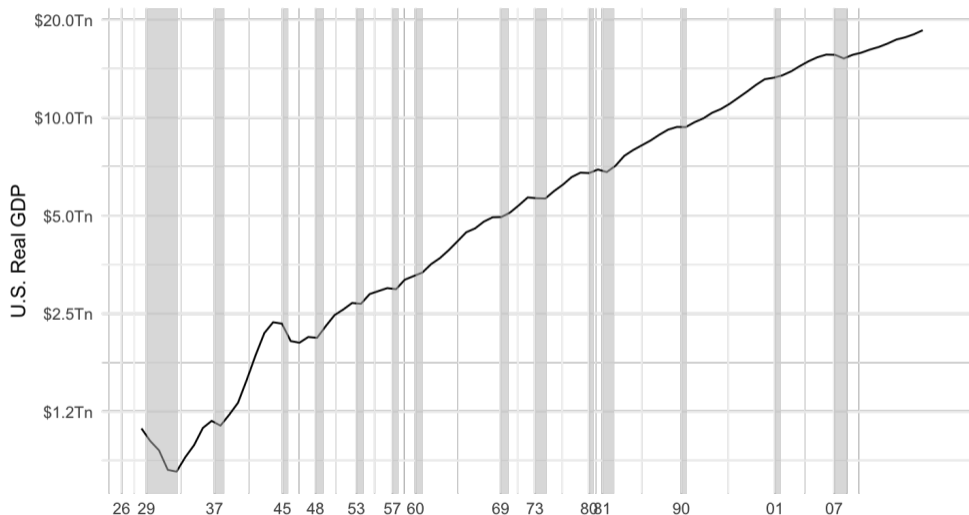
- Let's look at U.S. "Real" GDP (somehow, we've taken out inflation). \$1Tn = \$1,000Bn = \$1,000,000 = \$1,000,000,000,000.





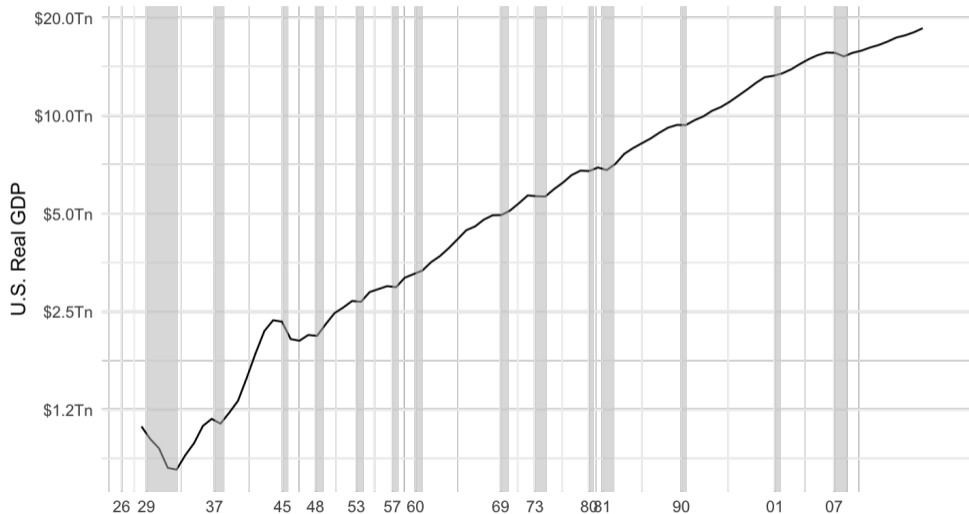
# U.S. Real GDP - Log Scale (1929-2019)

- Let's look at U.S. "Real" GDP on a log Scale. (in 2012 dollars)

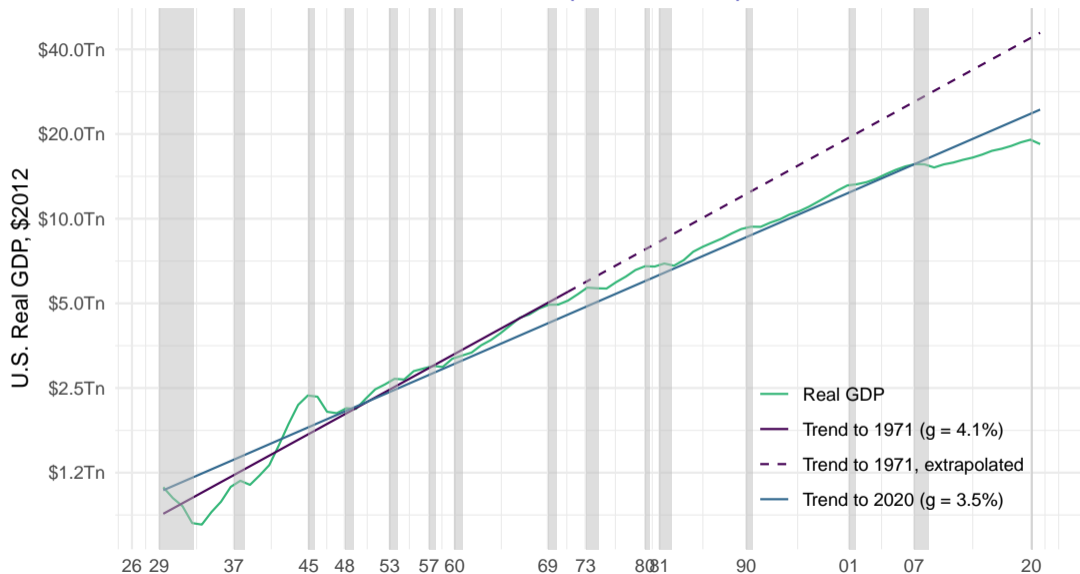


# U.S. Real GDP (1929-2019)

- What do you notice?



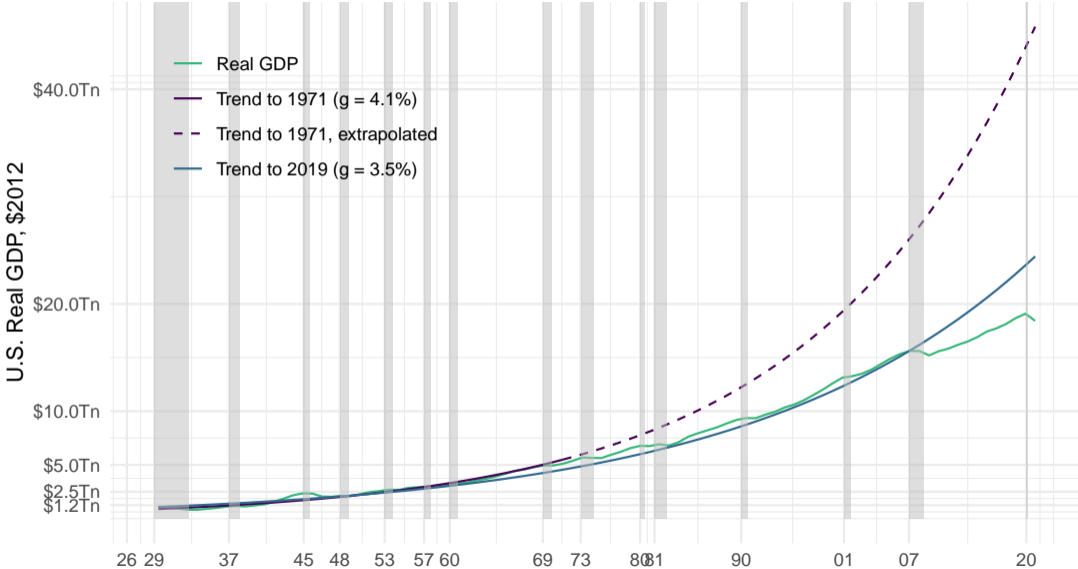
# What is the cycle, what is the trend? (Figure 1.1)



## What is the cycle, what is the trend?

- Blue line fits a trend line until 2019.
- Purple line fits a trend line until 1971.
- Implication: growth has substantially slowed since 1971.
- During the TA section this week, you'll replicate Figure 1.1 using NIPA data (available online) and Google Sheets.

# What is the cycle, what is the trend? (Figure 1.2)

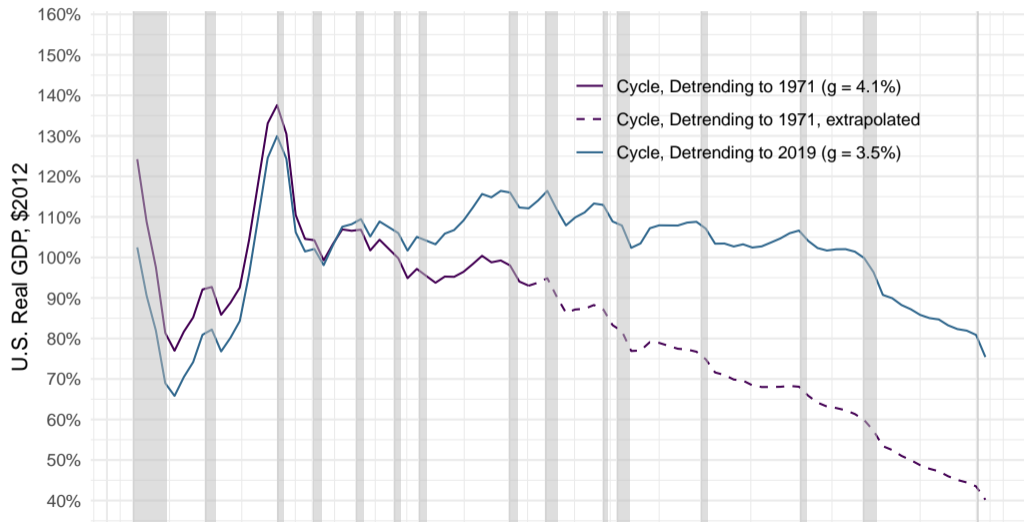


## Importance of Cycle VS Trend

- This may seem like a technical detail, but it's really not.
- The trend is often seen as a measure of “potential output”: that is, how much output could potentially be produced given a state of technology, if resources were fully used (unemployment was minimal)
- What you assume about the trend matters a great deal.
- We'll see that it impacts how much monetary policy, and fiscal policy, authorities need to do.
- It also interacts with how much of fluctuations in GDP is due to supply VS demand.

## What is the cycle, what is the trend? (Figure 1.3)

- GDP as a fraction of Trend GDP, in %. ( $\text{GDP} / \text{Trend GDP}$ )



## Section 3

# Product Approach



# Components

- According to the **product approach to GDP**, GDP is the sum of four components:
  - ▶ Consumption spending by households (C).
  - ▶ Investment spending by households and corporations (I).
  - ▶ Government purchases (G).
  - ▶ Net exports (NX).

# Components

- GDP is equal to the total aggregate demand for goods:

$$Y = C + I + G + X - M.$$

- We often define net exports as:<sup>1</sup>

$$NX \equiv X - M,$$

- so that GDP is simply:

$$Y = C + I + G + NX.$$

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<sup>1</sup>In some textbooks (as well as in earlier versions of these lecture notes), imports are denoted by  $IM$  instead of  $M$ .

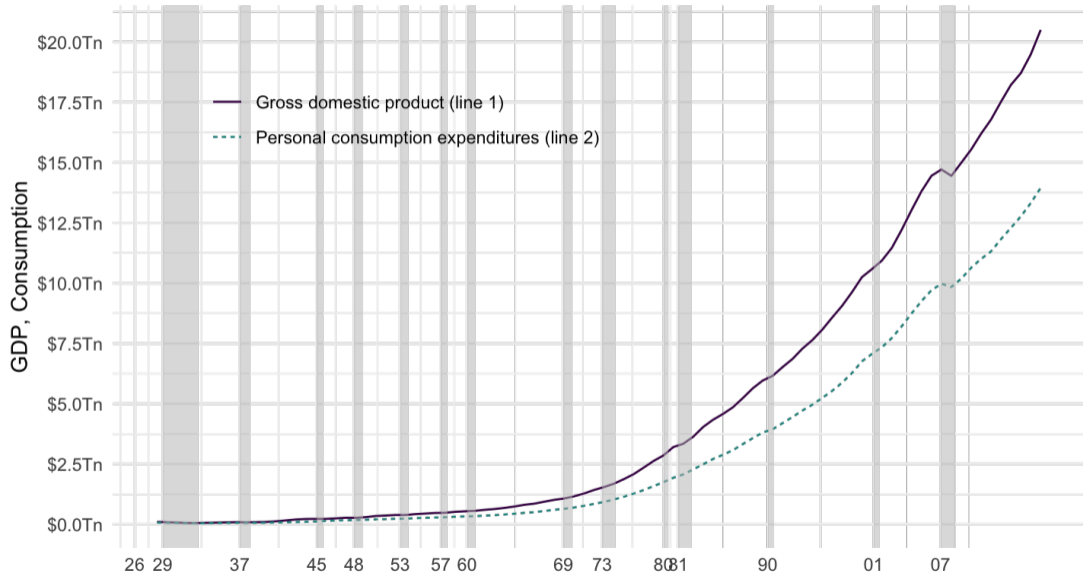
# Main GDP Components (NIPA)

Table 1.1.5. Gross Domestic Product (% of GDP)	1929	1949	1969	1989	2009	2019
Gross domestic product	100 %	100 %	100 %	100 %	100 %	100 %
Personal consumption expenditures	74 %	65.4 %	59.3 %	63.4 %	68.1 %	68 %
Goods	41.9 %	39.7 %	29.9 %	25.2 %	22 %	21 %
Durable goods	9.4 %	9.8 %	8.9 %	8.8 %	7 %	7.1 %
Nondurable goods	32.5 %	29.9 %	21 %	16.5 %	15 %	13.9 %
Services	32.1 %	25.8 %	29.4 %	38.2 %	46.1 %	46.9 %
Gross private domestic investment	16.4 %	14.3 %	17.1 %	17.7 %	13.4 %	17.5 %
Fixed investment	14.9 %	15.3 %	16.2 %	17.2 %	14.4 %	17.2 %
Nonresidential	11.1 %	9.9 %	11.8 %	12.7 %	11.7 %	13.4 %
Structures	5.3 %	3.4 %	3.7 %	3.4 %	3.2 %	2.9 %
Equipment	5.3 %	5.8 %	6.4 %	6.6 %	4.6 %	5.8 %
Intellectual property products	0.6 %	0.7 %	1.7 %	2.7 %	3.9 %	4.7 %
Residential	3.9 %	5.4 %	4.4 %	4.5 %	2.7 %	3.7 %
Change in private inventories	1.5 %	-1 %	0.9 %	0.5 %	-1 %	0.3 %
Net exports of goods and services	0.4 %	1.9 %	0.1 %	-1.5 %	-2.7 %	-2.9 %
Exports	5.7 %	5.3 %	5.1 %	8.9 %	10.9 %	11.7 %
Goods	5.1 %	4.5 %	3.8 %	6.6 %	7.3 %	7.7 %
Services	0.6 %	0.8 %	1.3 %	2.3 %	3.6 %	4 %
Imports	5.3 %	3.4 %	5 %	10.5 %	13.7 %	14.6 %
Goods	4.3 %	2.5 %	3.6 %	8.6 %	11 %	11.8 %
Services	1 %	0.9 %	1.3 %	1.9 %	2.7 %	2.8 %
Government consumption expenditures and gross investment	9.2 %	18.3 %	23.5 %	20.4 %	21.3 %	17.5 %
Federal	1.8 %	11.2 %	12.9 %	9.5 %	8.4 %	6.6 %
National defense	1 %	8.2 %	10 %	6.9 %	5.5 %	3.9 %
Nondefense	0.8 %	3 %	2.9 %	2.5 %	3 %	2.7 %

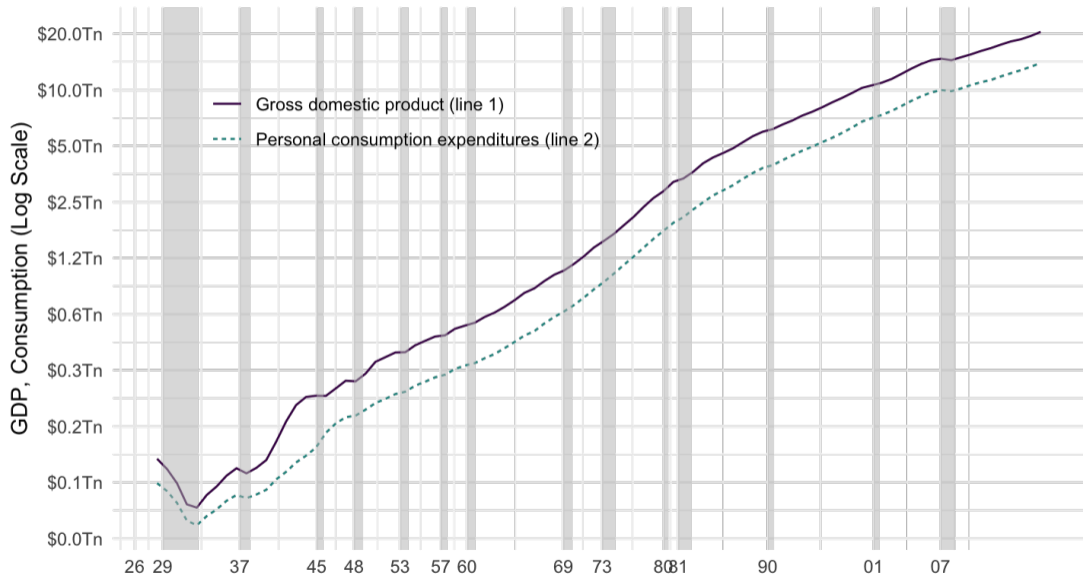
# Don't confuse: GDP By Industry

INDUSTRY	Industry	% of GDP	INDUSTRY	Industry	% of GDP
21	Mining	1.7 %	55	Management of companies and enterprises	1.9 %
211	Oil and gas extraction	1.2 %	56	Administrative and waste management services	3.1 %
22	Utilities	1.6 %	561	Administrative and support services	2.8 %
2211	Electric power generation, transmission, and distribution	1.2 %	5613	Employment services	1.3 %
23	Construction	4.1 %	561X	Other administrative and support services	1 %
311FT	Food and beverage and tobacco products	1.3 %	6	Educational services, health care, and social assistance	8.7 %
31G	Manufacturing	11.3 %	61	Educational services	1.2 %
31ND	Nondurable goods	5 %	62	Health care and social assistance	7.5 %
325	Chemical products	1.8 %	621	Ambulatory health care services	3.7 %
334	Computer and electronic products	1.4 %	6211	Offices of physicians	1.7 %
33DG	Durable goods	6.3 %	622	Hospitals	2.4 %
42	Wholesale trade	5.9 %	7	Arts, entertainment, recreation, accommodation, and food services	4.2 %
441	Motor vehicle and parts dealers	1 %	71	Arts, entertainment, and recreation	1.1 %
44RT	Retail trade	5.5 %	72	Accommodation and food services	3.1 %
48TW	Transportation and warehousing	3.2 %	722	Food services and drinking places	2.2 %
4A0	Other retail	3 %	81	Other services, except government	2.1 %
51	Information	5.2 %	FIRE	Finance, insurance, real estate, rental, and leasing	20.9 %
511	Publishing industries, except internet (includes software)	1.3 %	G	Government	12.4 %
5112	Software publishers	1 %	GDP	Gross domestic product	100 %
513	Broadcasting and telecommunications	2.1 %	GF	Federal	3.8 %
514	Data processing, internet publishing, and other information services	1.2 %	GFG	Federal general government	3.5 %
52	Finance and insurance	7.6 %	GFGD	National defense	2 %
521CI	Federal Reserve banks, credit intermediation, and related activities	3 %	GFGN	Nondefense	1.5 %
523	Securities, commodity contracts, and investments	1.5 %	GSL	State and local	8.5 %
524	Insurance carriers and related activities	3 %	GSLG	State and local general government	7.8 %
5241XX	Insurance carriers, except direct life insurance	1.7 %	GSLGE	State and local government educational services	4 %
5242	Agencies, brokerages, and other insurance related activities	1 %	GSLGO	State and local government other services	2.9 %
53	Real estate and rental and leasing	13.3 %	HS	Housing	9.7 %
531	Real estate	12.2 %	HSO	Owner-occupied housing	6.9 %
532RL	Rental and leasing services and lessors of intangible assets	1.1 %	HST	Tenant-occupied housing	2.9 %
54	Professional, scientific, and technical services	7.5 %	ICT	Information-communications-technology-producing industries [3]	6.8 %
5411	Legal services	1.3 %	ORE	Other real estate	2.4 %
5412OP	Miscellaneous professional, scientific, and technical services	4.5 %	PGOOD	Private goods-producing industries [1]	17.8 %
5413	Architectural, engineering, and related services	1 %	PROF	Professional and business services	12.5 %

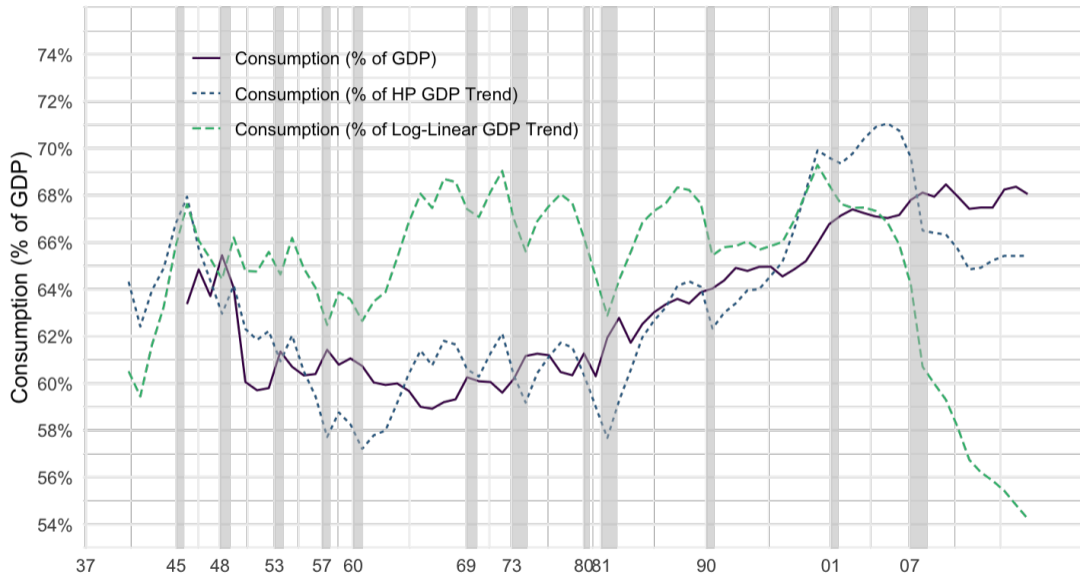
# US GDP and Consumption from NIPA (BEA)



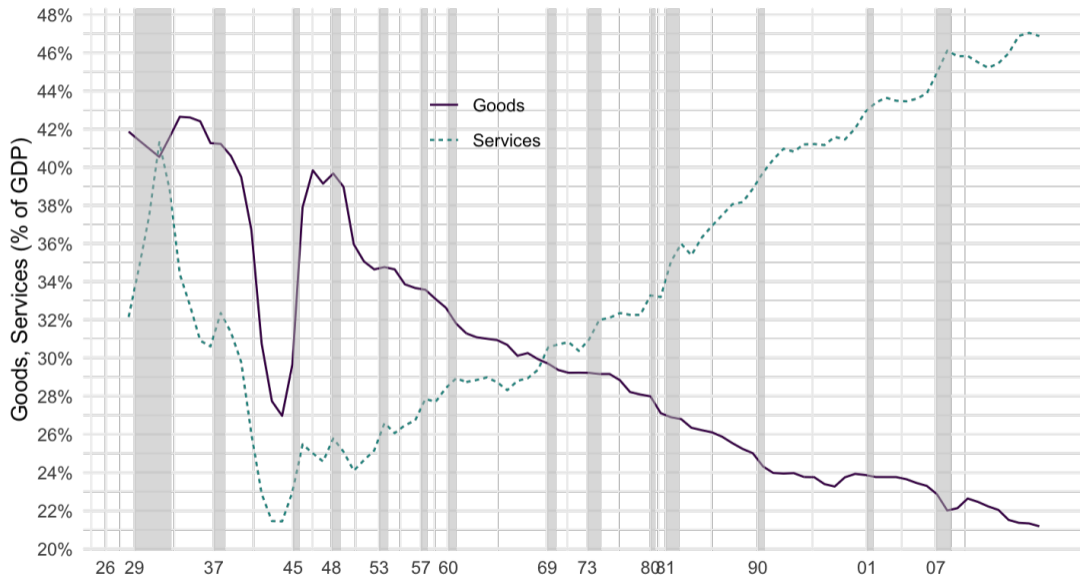
# US GDP and Consumption from NIPA - Log



# Consumption



# Goods and Services Consumption



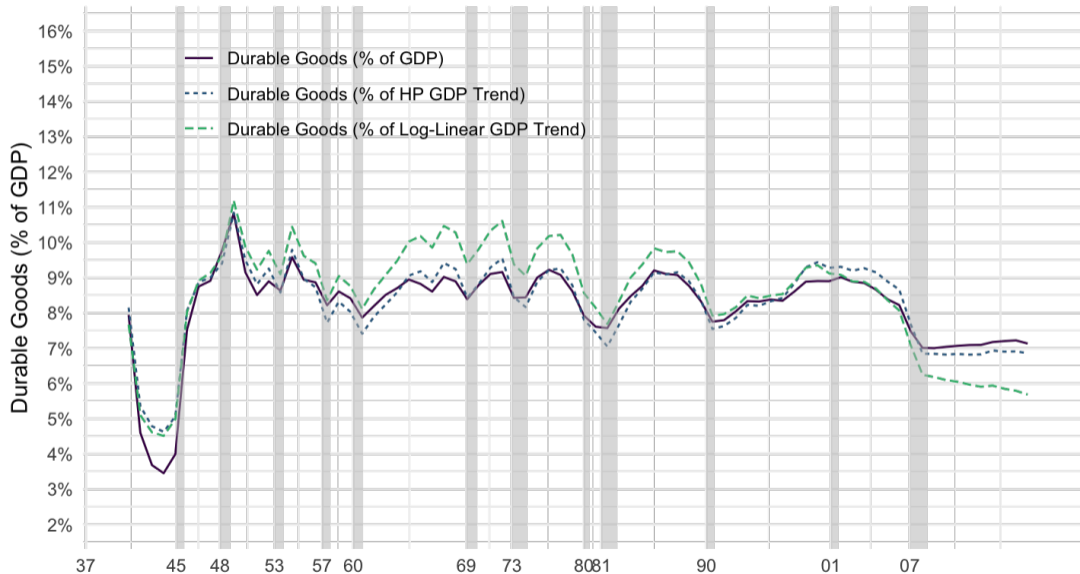


# Goods and Services Consumption

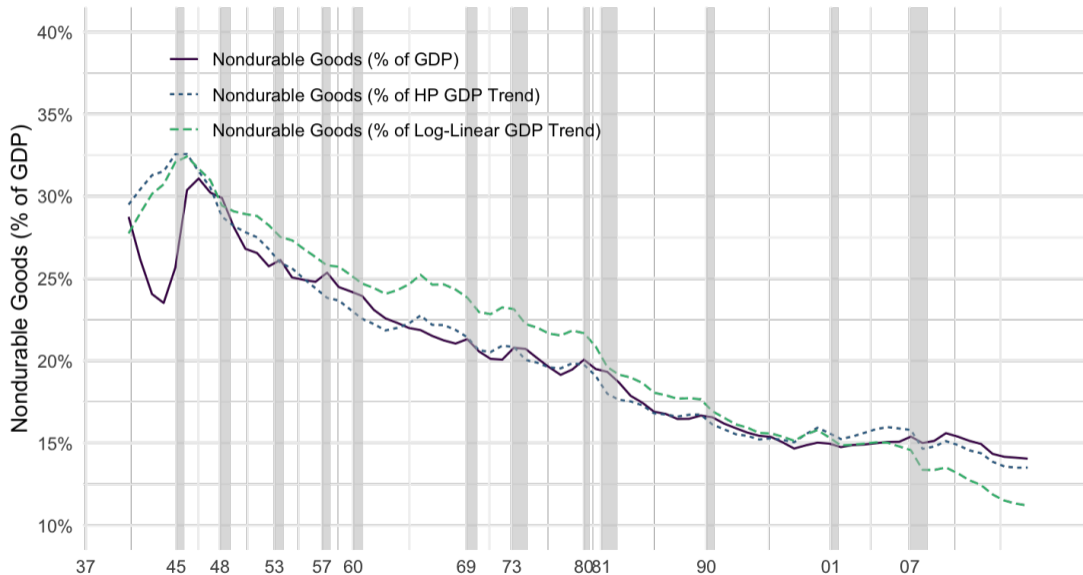
In turn, Personal Consumption Expenditures are composed of goods and services:

- **Durable goods** (by definition, more than 3 years of durability): for example, cars.
- **Non-durable Goods** (less than 3 years of durability).
- **Services**.

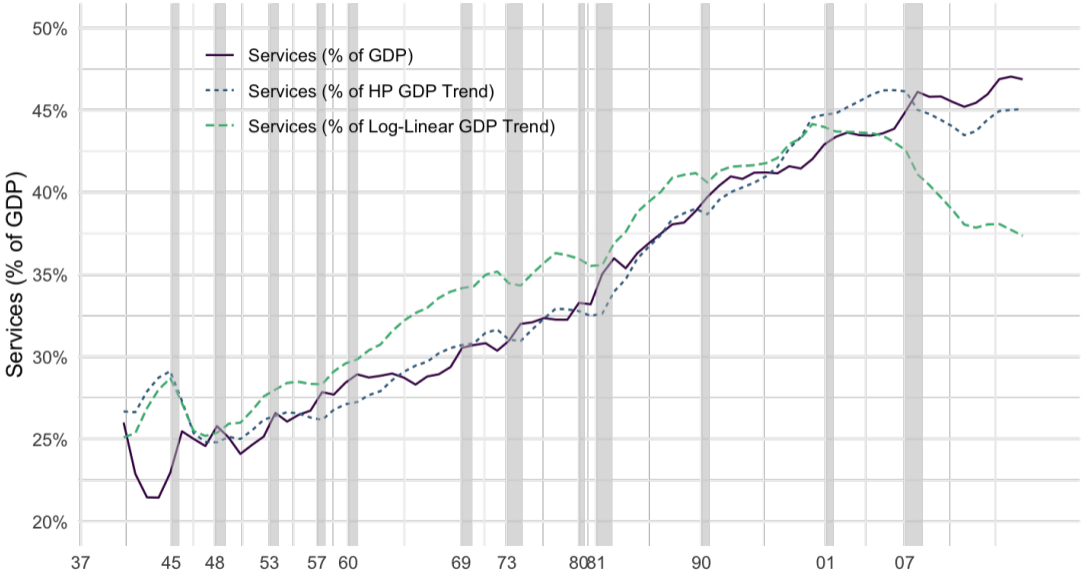
# Durable Goods



# Nondurable Goods



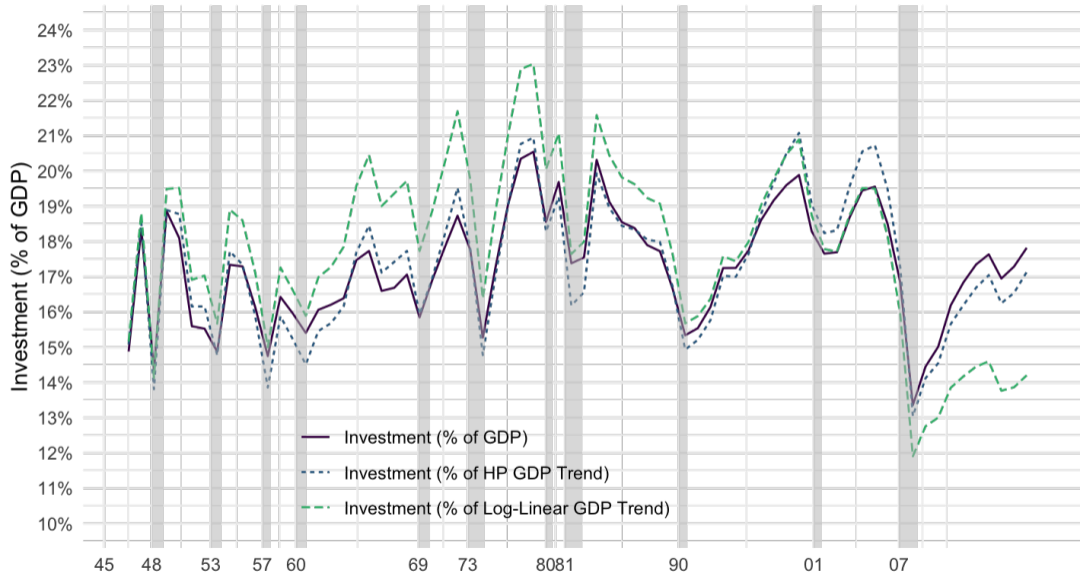
# Services



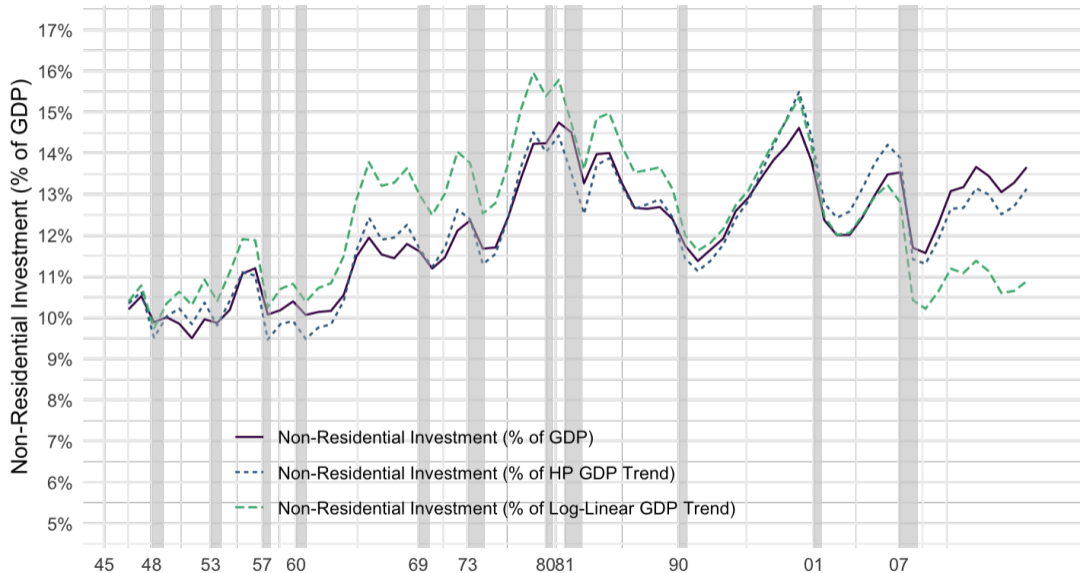
## Section 4

### Product Approach: Investment

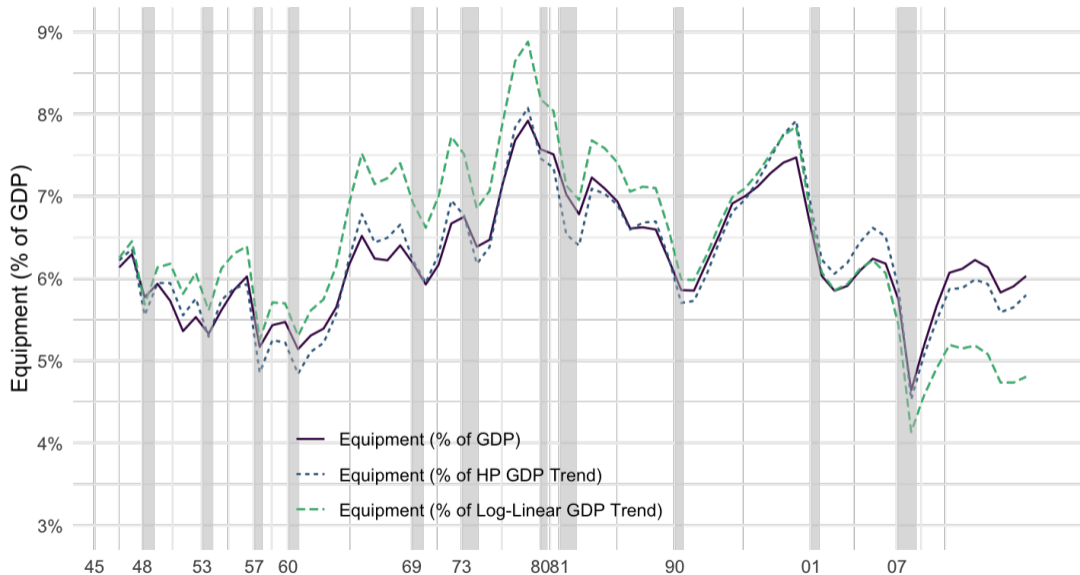
# Investment



# Non-Residential Investment

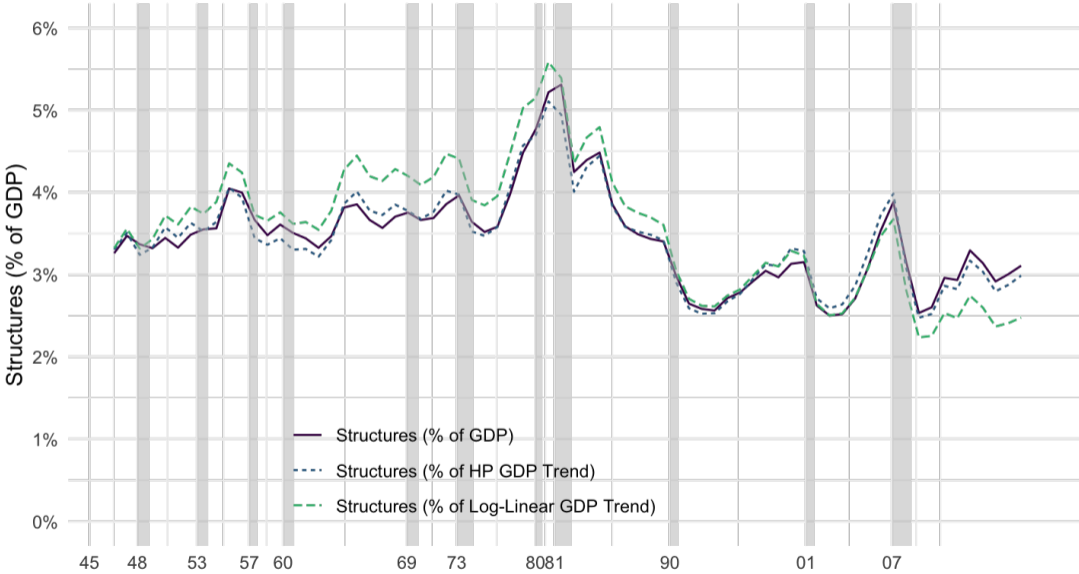


# Equipment

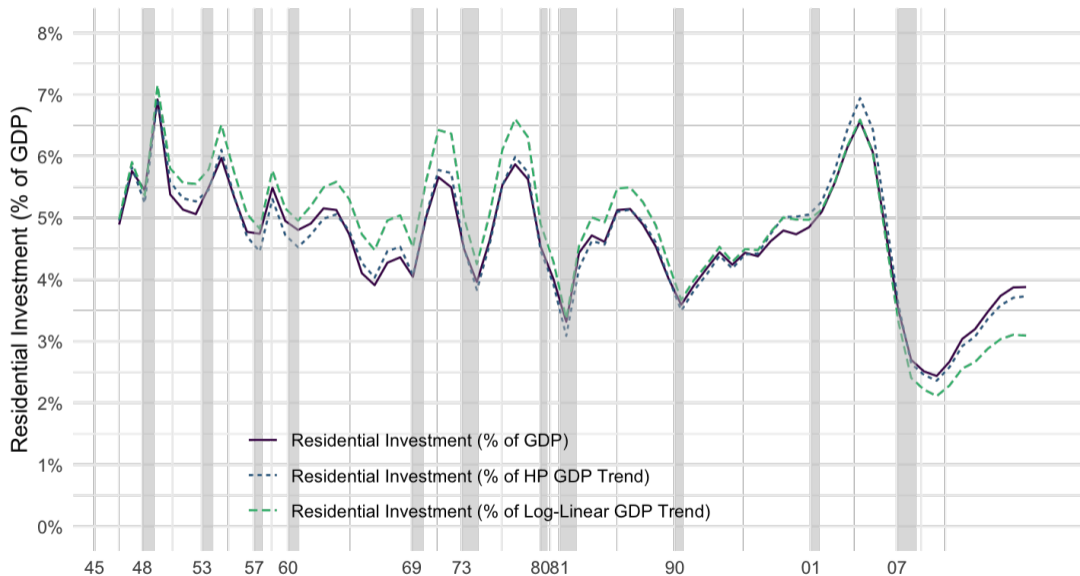




# Structures



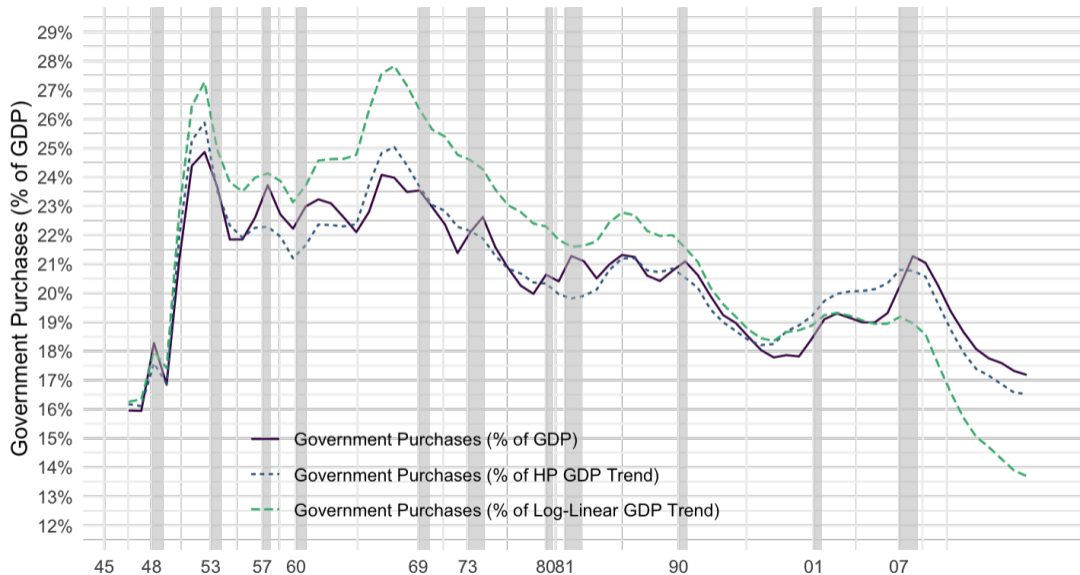
# Residential Investment



## Section 5

### Product Approach: Government Purchases

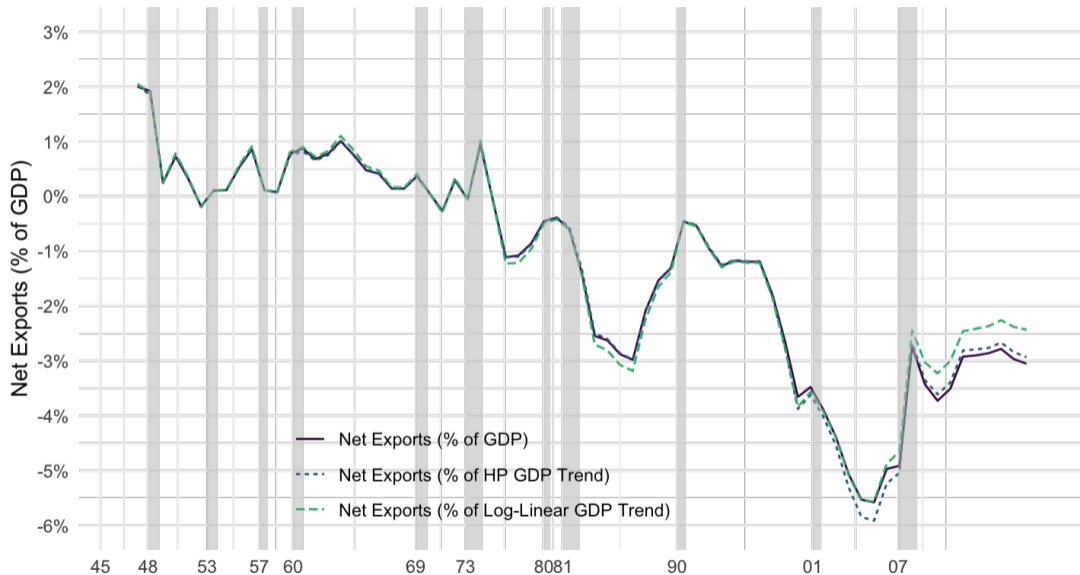
# Government Purchases



## Section 6

### Product Approach: Net Exports

# Net Exports



## Section 7

# Income Approach to GDP

# GDP, GNP, NNP, NI, PI

Table 1.7.5. Relation of GDP, GNP, NNP, National Income, and Personal Income	Line	1929	1949	1969	1989	2009	2019
Gross domestic product (GDP)	1	100 %	100 %	100 %	100 %	100 %	100 %
Plus: Income receipts from the rest of the world	2	1.1 %	0.7 %	1.2 %	3.1 %	4.5 %	5.4 %
Less: Income payments to the rest of the world	3	0.4 %	0.2 %	0.6 %	2.7 %	3.5 %	4 %
Equals: Gross national product	4	100.7 %	100.5 %	100.6 %	100.4 %	101 %	101.4 %
Less: Consumption of fixed capital	5	10 %	11.8 %	12.3 %	14.9 %	16.4 %	16.2 %
Private	6	9 %	8.3 %	8.8 %	11.5 %	13.3 %	13.4 %
Domestic business	7	7.8 %	6.9 %	7.3 %	9.4 %	10.6 %	10.6 %
Capital consumption allowances	8	6.3 %	5.5 %	7.8 %	10.4 %	10.8 %	12.2 %
Less: Capital consumption adjustment	9	-1.5 %	-1.4 %	0.5 %	1 %	0.2 %	1.6 %
Households and institutions	10	1.2 %	1.3 %	1.5 %	2.1 %	2.8 %	2.8 %
Government	11	1 %	3.6 %	3.5 %	3.3 %	3.1 %	2.7 %
General government	12	0.8 %	3.4 %	3.3 %	3 %	2.7 %	2.4 %
Government enterprises	13	0.1 %	0.2 %	0.2 %	0.3 %	0.4 %	0.4 %
Equals: Net national product	14	90.8 %	88.6 %	88.3 %	85.6 %	84.6 %	85.2 %
Less: Statistical discrepancy	15	0.7 %	0.6 %	0.2 %	1.2 %	1.3 %	0.5 %
Equals: National income	16	90.1 %	88 %	88.2 %	84.4 %	83.2 %	84.7 %
Corporate profits with inventory valuation and capital consumption adjustments	17	10.4 %	10.7 %	9.7 %	7.3 %	9.6 %	9.7 %
Taxes on production and imports less subsidies	18	6.5 %	7.5 %	7.8 %	6.6 %	6.7 %	6.6 %
Contributions for government social insurance, domestic	19	0.1 %	1.8 %	4.3 %	6.8 %	6.7 %	6.6 %
Net interest and miscellaneous payments on assets	20	4.4 %	1 %	3.2 %	7.6 %	3.7 %	3 %
Business current transfer payments (net)	21	0.5 %	0.3 %	0.5 %	0.7 %	0.9 %	0.8 %
Current surplus of government enterprises	22	0 %	0 %	0 %	0.1 %	-0.1 %	-0.1 %
Plus: Personal income receipts on assets	23	12.1 %	6.6 %	9.9 %	17.1 %	12.8 %	14 %
Plus: Personal current transfer receipts	24	1.1 %	4.1 %	6.1 %	9.6 %	14.9 %	14.8 %
Equals: Personal income	25	81.6 %	77.5 %	78.6 %	82 %	83.5 %	86.8 %



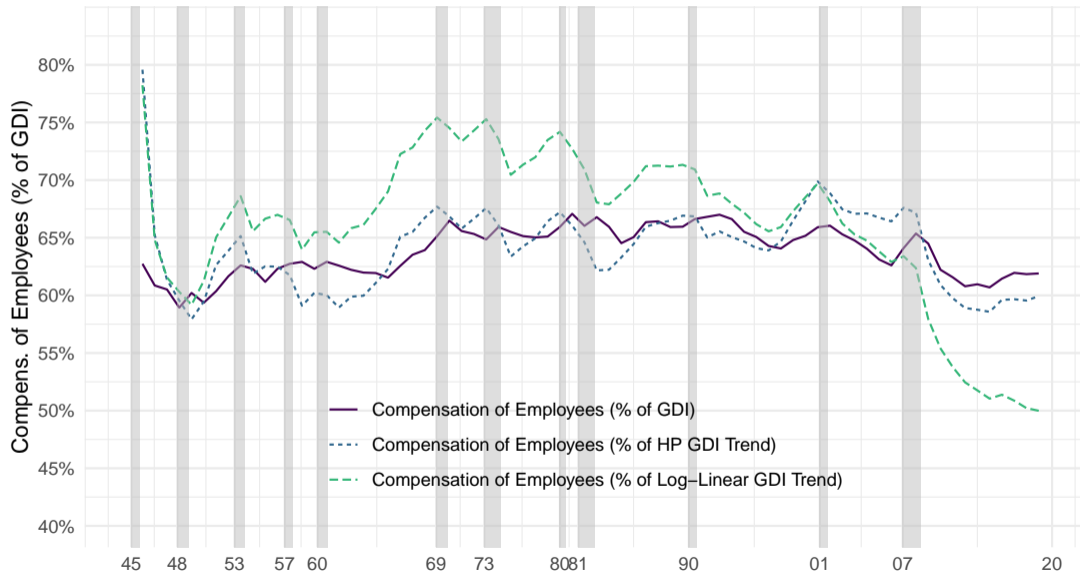
# National Income by Type

Table 1.12. National Income by Type of Income (% of National Income)	Line	1929	1949	1969	1989	2009	2019
National income	1	100 %	100 %	100 %	100 %	100 %	100 %
Compensation of employees	2	54.6 %	60.2 %	65.1 %	66 %	64.5 %	62.9 %
Wages and salaries	3	53.6 %	56.2 %	57.8 %	54.3 %	52 %	51.2 %
Government	4	5.3 %	8.7 %	11.8 %	10.1 %	9.8 %	8 %
Other	5	48.3 %	47.5 %	46 %	44.2 %	42.2 %	43.2 %
Supplements to wages and salaries	6	1 %	4 %	7.4 %	11.7 %	12.6 %	11.7 %
Employer contributions for employee pension and insurance funds	7	1 %	2.6 %	4.8 %	7.6 %	8.7 %	8.1 %
Employer contributions for government social insurance	8	0 %	1.4 %	2.5 %	4.1 %	3.8 %	3.6 %
Proprietors' income with IVA and CCAdj	9	14.9 %	14.5 %	8.6 %	7.2 %	7.8 %	9.1 %
Farm	10	6 %	5 %	1.4 %	0.7 %	0.2 %	0.2 %
Nonfarm	11	8.9 %	9.5 %	7.2 %	6.5 %	7.6 %	9 %
Rental income of persons with CCAdj	12	6.4 %	3.3 %	2.3 %	0.5 %	2.7 %	4.3 %
Corporate profits with IVA and CCAdj	13	11.5 %	12.1 %	11 %	8.7 %	11.5 %	11.4 %
Taxes on corporate income	14	1.4 %	4.2 %	4.1 %	2.6 %	1.7 %	1.2 %
Profits after tax with IVA and CCAdj	15	10.1 %	7.9 %	6.8 %	6.1 %	9.8 %	10.2 %
Net dividends	16	6.2 %	3.1 %	3 %	3.8 %	5.2 %	7.4 %
Undistributed profits with IVA and CCAdj	17	3.9 %	4.8 %	3.8 %	2.3 %	4.7 %	2.8 %
Net interest and miscellaneous payments	18	4.9 %	1.1 %	3.6 %	9 %	4.5 %	3.6 %
Taxes on production and imports	19	7.2 %	8.7 %	9.3 %	8.4 %	8.5 %	8.2 %
Less: Subsidies	20	0 %	0.2 %	0.5 %	0.6 %	0.5 %	0.4 %
Business current transfer payments (net)	21	0.5 %	0.3 %	0.5 %	0.8 %	1 %	0.9 %
To persons (net)	22	0.4 %	0.1 %	0.4 %	0.5 %	0.3 %	0.3 %
To government (net)	23	0.1 %	0.1 %	0.2 %	0.3 %	0.7 %	0.5 %
To the rest of the world (net)	24					0 %	0.1 %
Current surplus of government enterprises	25	0 %	0 %	0 %	0.2 %	-0.1 %	-0.1 %

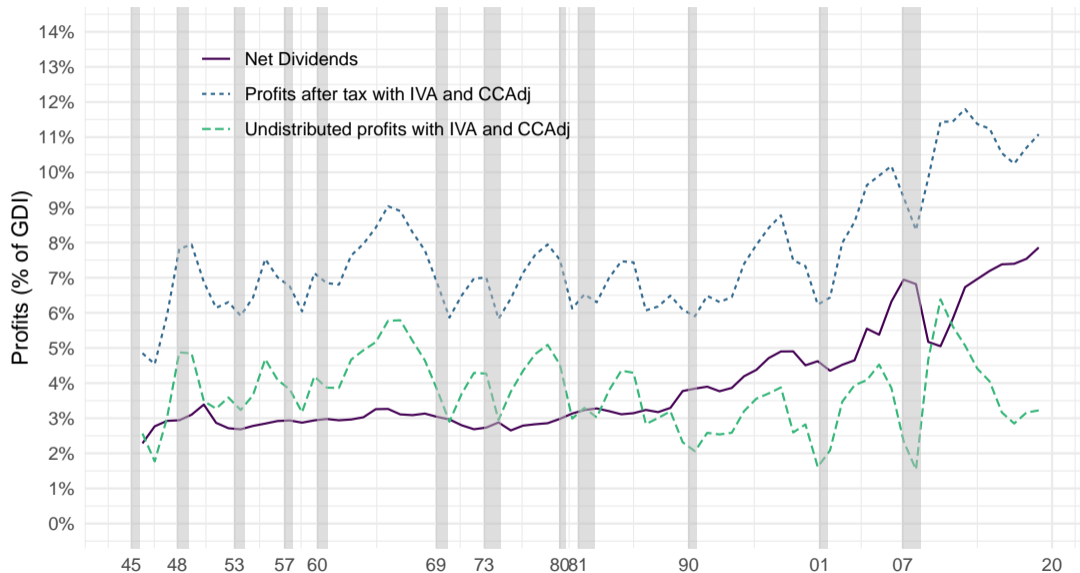
# National Income by Type

Table 1.10. Gross Domestic Income by Type of Income	1929	1949	1969	1989	2009	2019
Gross domestic income	100 %	100 %	100 %	100 %	100 %	100 %
Compensation of employees, paid	49.5 %	53.3 %	57.5 %	56.4 %	54.5 %	53.6 %
Wages and salaries	48.6 %	49.7 %	51 %	46.4 %	43.9 %	43.7 %
To persons		49.7 %	51 %	46.3 %	43.8 %	43.6 %
To the rest of the world		0 %	0 %	0 %	0.1 %	0.1 %
Supplements to wages and salaries	0.9 %	3.5 %	6.5 %	10 %	10.6 %	10 %
Taxes on production and imports	6.6 %	7.7 %	8.3 %	7.2 %	7.2 %	7 %
Less: Subsidies	0 %	0.2 %	0.4 %	0.5 %	0.4 %	0.4 %
Net operating surplus	33.9 %	27.2 %	22.4 %	21.9 %	22.1 %	23.5 %
Private enterprises	33.9 %	27.2 %	22.4 %	21.8 %	22.2 %	23.5 %
Net interest and miscellaneous payments, domestic industries	3.9 %	1 %	3.3 %	8.4 %	5.2 %	4.1 %
Business current transfer payments (net)	0.5 %	0.3 %	0.5 %	0.7 %	0.9 %	0.8 %
Proprietors' income with inventory valuation and CCAs	13.5 %	12.8 %	7.6 %	6.1 %	6.6 %	7.8 %
Rental income of persons with CCA	5.8 %	2.9 %	2 %	0.4 %	2.3 %	3.6 %
Corporate profits with inventory valuation and CCAs, domestic industries	10.2 %	10.3 %	9 %	6.2 %	7.3 %	7.2 %
Taxes on corporate income	1.3 %	3.7 %	3.6 %	2.2 %	1.4 %	1 %
Profits after tax with inventory valuation and CCAs	8.9 %	6.6 %	5.4 %	4 %	5.8 %	6.2 %
Net dividends	5.4 %	2.4 %	2.3 %	2.7 %	3.5 %	3.9 %
Undistributed corporate profits with inventory valuation and CCAs	3.5 %	4.2 %	3.1 %	1.3 %	2.3 %	2.3 %
Current surplus of government enterprises	0 %	0 %	0 %	0.1 %	-0.1 %	-0.1 %
Consumption of fixed capital	10 %	11.9 %	12.3 %	15 %	16.6 %	16.2 %
Private	9.1 %	8.3 %	8.8 %	11.7 %	13.5 %	13.5 %
Government	1 %	3.6 %	3.5 %	3.4 %	3.1 %	2.8 %
Statistical discrepancy	0.7 %	0.6 %	0.2 %	1.2 %	1.3 %	0.5 %

# Compensation of Employees



# Profits, Net Dividends, Undistributed Profits



## Section 8

### Conclusion

## More advanced treatment of macroeconomics

- Only for those of you who want to dig further into each one of the topics: absolutely not exam material !
- I also teach a 2nd-year Ph.D. class on the exact same topic, entitled “Evidence-Based Macroeconomics and Finance” whose syllabus you can find here.
- This is the last class in Macroeconomics students taken on before they write a Ph.D. Dissertation
- You can access these classes by the following process. For example: the econ102 class on the Phillips curve will be available here:  
<https://fgeerolf.com/econ102/handouts/phillips.html>
- Then the corresponding econ221 class is available here:  
<https://fgeerolf.com/econ221/handouts/phillips.html>.