I. Introduction to macroeconomic analysis

1. Orthodox and heterodox approaches to macroeconomics: private vs public sectors

At least two macroeconomics

Macroeconomics is not a monolithic discipline, though for practical purposes it almost is. Academia, economic research, university courses, government, international economic institutions, the media… are all dominated by 'mainstream macroeconomics'[1]. There are many other approaches to macroeconomics, grouped together under the heading 'heterodox macroeconomics', which have in common some form of opposition to the mainstream.

The orthodox (mainstream) and the heterodox approaches to macroeconomics differ along many dimensions. For some of those dimensions, some heterodox approaches are close to the orthodox one; for instance, regarding the economic role of the government, the heterodox Austrian school is even more orthodox than the mainstream that, for instance, the heterodox Marxian school. It is therefore misleading to view non-mainstream macroeconomics as monolithic or homogeneous: on some topics or issues, some heterodoxy is not very different from orthodoxy. That is why it is convenient to establish the distinction orthodoxy/heterodoxy with respect to particular (though broad) issues. Two such issues:

- **I1**. What should the economic role of the public sector ('the government') be?
- **I2**. How should economic research be conducted? (What counts as valid economic analysis?)

Dominant or dominated public sector?

The orthodox response to **I1** (there are some qualifications within orthodoxy) is that, in 'normal' circumstances, public intervention in the economy should be reduced to what is considered essential (to keep circumstances 'normal'); only in extraordinary circumstances (some kind of economic crisis or general economic malfunction) public intervention is justified, but just temporarily (until the intervention makes circumstances return to 'normal'). So orthodoxy claims that the private sector of the economy should be given as much freedom as possible and that the public sector plays a subordinate role (to help the private sector exercise its economic freedom).

On **I1**, heterodoxy can be associated with the view that the public sector is, at least, an important, from an economic point of view, as the private sector. The public sector is not subordinated to the private sector; rather both should collaborate. The perception in heterodoxy is that the private sector tends to generate economic instability (and other undesirable economic outcomes: unemployment, unfair distribution of income and wealth, negative externalities such as pollution, resource exhaustion, global warming, biodiversity loss, ecosystem poisoning…). For that reason, according

[1] "Let's therefore define 'mainstream economics' as theories shared by most academic economists at what they claim to be 'leading' universities, published in what they describe as the 'top' journals, as ranked by… well… by mainstream economists. This is a fairly well-defined community." (James K. Galbraith, https://www.postneoliberalism.org/articles/a-comment-on-dani-rodriks-new-paradigm-for-economic-policy/)

to the heterodox view, a healthy economy requires sustained public intervention, at least through general regulation and targetted policy measures (mainly, fiscal policy and industrial policy; and also by direct participation in economic activities by means of public enterprises).
Orthodoxy puts stringent conditions on public policy: the orthodox view claims that no industrial policy is the best industrial policy (the only industrial policy acceptable is the one promoting freedom in the private sector, which amounts to reducing public intervention in economic activity) and that fiscal policy should be subject to strict limits ('fiscal rules'), since orthodoxy imposes austerity constraints to the public sector. For instance, the eurozone relies on two fiscal rules: annual public deficit not larger than 3% of economic output (Gross Domestic Product, GDP) and accumulated public debt at most 60% of GDP.

The current political instability in France, eurozone's second biggest economy, can be traced back to the need to follow orthodox economic prescriptions on fiscal policy: specifically, to lower the French public deficit (5.8% of GDP in 2024) and public debt (currently, €3.3 billion (3.3×10^{12}) or 114% of GDP, with the European Union (EU) average being 81%), in this case by cutting public spending and raising taxes by a net amount of €44,000 million[2].

The distinction between orthodoxy and heterodoxy on this matter is relevant for macroeconomic policy. The orthodox policy prescription to deal with episodes of economic crisis is for the public sector to implement austerity measures: to keep the government budget tight. From the heterodox perspective this is non-sense: an economic crisis means that the private sector is underperforming, so the natural response is for the public sector to overexpand and compensate the difference.

If history matters: the EU response to the 2008 global financial crisis was orthodox and the crisis was aggravated (another criss was created: the euro crisis); the US response was heterodox (expansionary fiscal policy, with government increasing spending massively), and the US recovered quickly and sooner. Perhaps not surprisingly, the EU attack to more recent economic shocks (the 2020 pandemic and the 2022 geopolitical tensions caused by the Russian invasion of Ukraine) were against orthodoxy. Specifically, to address the economic impact of COVID-19, the EU Heads of State approved in July 2020 the (temporary) recovery programme Next Generation EU (funded with some €800.000 million), which involved forgiving non-compliance with fiscal rules[3].

Rigour-relevance trade-off

Concerning **I2**, the difference between orthodoxy and heredoxy arises from the answer given to the rigour-relevance debate, tension or trade-off. Google is helpful to describe the problem. Typing "macroeconomic rigour relevance" generates the following answer.

[2] See, for instance, https://theconversation.com/the-french-economy-has-a-boomer-problem-and-is-spending-way-too-much-on-pensions-264912 and https://www.atlanticcouncil.org/blogs/new-atlanticist/experts-react/experts-react-the-french-government-has-collapsed-again-what-does-this-mean-for-france-the-eu-and-macron/.

[3] See https://next-generation-eu.europa.eu/index_en.

> "The 'rigor vs. relevance' debate in macroeconomics concerns the perceived trade-off between the mathematical rigor of economic models and their practical relevance to real-world economic problems. While mathematical formality has become a primary goal, leading to potentially sterile models detached from empirical realities, critics argue for increasing the relevance of economic research by improving empirical rigor and developing non-mathematical approaches that can address contemporary societal issues more effectively."

Googling "macroeconomic theory rigor relevance" gives rise to a similar answer.

> "Macroeconomic theory faces a persistent tension between rigor (mathematical precision, formal modeling) and relevance (applicability to real-world policy and phenomena). While rigorous models offer internal logic and make predictions, critics argue they often rely on oversimplified assumptions about complex, dynamic economic systems, potentially leading to unreliable forecasts and poor policy guidance, as seen with standard models failing to predict or explain the 2008 Great Recession. Conversely, theories with high relevance, but less mathematical rigor, may struggle to gain broad acceptance or be clearly communicated within the academic framework."

A third attempt with "macroeconomic theory rigour relevance" yields the following.

> "The relationship between rigor and relevance in macroeconomic theory is a long-standing debate, with the two often seen as being in tension or trade-off. While rigor refers to the strict adherence to methodological standards and internal consistency of a model, relevance concerns a theory's ability to address real-world economic phenomena and inform policy. Some argue that highly rigorous, mathematically complex models may sacrifice real-world applicability, while overly pragmatic or context-specific theories might lack the internal consistency for broad acceptance. Striking a balance is seen as a key challenge for macroeconomists to ensure their theories are both theoretically sound and practically useful."

Roughly speaking, orthodoxy takes sides for rigour, whereas heterodoxy puts relevance first. **I1** and **I2** are connected. The orthodox approach uses appropriately built mathematical models (that is, models with assumptions not judged by its realism or empirical relevance) to support the claim that mininum public intervention produces the best macroeconomic outcome (or even to prove that macroeconomic distress is caused by 'excessive' public interference with private activity). The heterodox approach holds that solving real, pressing problems comes first, and that historical evidence proves that the public sector has the means to deal with them efficiently, even if there is no universal agreed-upon formal model delivering such results.

Power in economics

The Google answers miss one aspect on relevance: relevance, in the orthodox-heterodox struggle, does not only refer to 'empirical relevance' but also to whether something else than economic factors are relevant to explain economic outcomes or processes. Specifically, it is characteristically heterodox to complement the economic dimension of

reality with the social, political, cultural… dimension. In particular, heterodox analysis attributes great importance to politics: power plays a fundamental role in shaping economic outcomes. Power, tension, conflict… is typically neglected in orthodox analysis. But for heterodoxy this makes the analysis not very relevant, as 'markets' do not operate in a socio-political vacuum: even without governments, there is power (capacity to influence outcomes) and it is rarely evenly distributed, so that those with more power haves an advantage to get the economic outcomes they prefer.

In its modern origin (around the 17th century) economics was understood in what are now heterodox terms. The then name of the discipline, Political Economy, captured the multidimensional approach to the analysis of economic reality. During the last third of the 19th century an intellectual change emerged (the 'marginal revolution', associated with the mathematization of Political Economy) that eventually came to dominate the discipline. Rebranding was part of the change: 'Economics' replaced 'Political Economy' as 'the name' for economic science. Heterodox economists tend to use the name 'Political Economy' to designate their field of study.

Political agendas in macroeconomics

It is difficult to regard this as a casual event, but the orthodox view of the world and the corresponding economic policy prescriptions are extremely convenient to the top 1% of the population (ranked in terms of wealth). The heterodox view sympathizes more with the socio-economic position of the remaining 99%.

> "There are two kind of economists: those who work to make the rich richer and those, me included, who work to make the poor less poor."
>
> José Luis Sampedro (1917-2013) https://en.wikipedia.org/wiki/Jos%C3%A9_Luis_Sampedro

The orthodox view contends that macroeconomics is just the study of the economy as a whole, with a focus on the behaviour of economic aggregates (like aggregate production, general price indices, total employment and unemployment, interest rates, exchange rates, public deficit, trade deficit…). The heterodox view replies that macroeconomics is about people: what they do, what they get.

Competing narratives

Capaldi and Lloyd (2011)[4] characterize two narratives in Political Economy.

- The liberty narrative. It originated with John Locke but became associated with Adam Smith. This narrative:

(a) promotes personal autonomy and both economic and political liberty;
(b) has a positive view of markets, technology and private property; and
(c) encourages the pursuit of happiness (progress is improvement).

- The equality narrative. It originated with Jean-Jacques Rousseau but became associated with Karl Marx. This narrative:

[4] Capaldi, Nicholas; Gordon Lloyd (2011): *The Two Narratives of Political Economy*, Wiley.

(a) promotes the social good, restrictions of individual autonomy and both economic and political equality;
(b) emphasizes the problems caused by markets, technology and private property; and
(c) encourages the securing of happiness (progress is perfection).

This course sympathizes with the heterodox view, although some contributions from the orthodox one are presented as well.

Mathiness and cargo cult science

Mainstream economics is apparently not much different from other scientific disciplines ('hard sciences'). Richard Feynman[5] (1974) alerted to the danger of being incompetent, negligent or dishonest in conducting scientific research. He introduced the expression 'cargo cult science' to (Google dixit) "describe scientific efforts that mimic the outward forms of scientific inquiry without understanding or adhering to the underlying principles of self-criticism and honesty necessary for genuine progress".

He claimed that cargo cult science is just a ritual, brainless imitation of 'real science', like South Seas people who, seeing airplanes landing with lots of good materials during Word War II, tried to get more airplanes land by imitating what they saw before the landing. In Feynman's (1974) words:

> "… they've arranged to imitate things like runways, to put fires along the sides of the runways, to make a wooden hut for a man to sit in, with two wooden pieces on his head like headphones and bars of bamboo sticking out like antennas —he's the controller— and they wait for the airplanes to land. They're doing everything right. The form is perfect. It looks exactly the way it looked before. But it doesn't work. No airplanes land. So I call these things cargo cult science, because they follow all the apparent precepts and forms of scientific investigation, but they're missing something essential, because the planes don't land."

> "… there is one feature I notice that is generally missing in cargo cult science. That is the idea that we all hope you have learned in studying science in school —we never explicitly say what this is, but just hope that you catch on by all the examples of scientific investigation (…) It's a kind of scientific integrity, a principle of scientific thought that corresponds to a kind of utter honesty —a kind of leaning over backwards. For example, if you're doing an experiment, you should report everything that you think might make it invalid —not only what you think is right about it (…) In summary, the idea is to try to give all of the information to help others to judge the value of your contribution; not just the information that leads to judgment in one particular direction or another (…) And it's this type of integrity, this kind of care not to fool yourself, that is missing to a large extent in much of the research in cargo cult science."

Feynman's remarks are fully applicable to econometrics, the part of economics concerned with testing theories and hypothesis statistically. Mainstream economics has developed by itself a variant

[5] Richard Feynman (1974): "Cargo Cult Science", Caltech commencement address given in 1974. Feynman was awarded in 1965 the Nobel Prize in Physics.

of cargo cult science. The economist Paul Romer[6] has introduced the term 'mathiness' to describe the malpractice of misusing mathematics in economic analysis.

> "The style that I am calling mathiness lets academic politics masquerade as science. Like mathematical theory, mathiness uses a mixture of words and symbols, but instead of making tight links, it leaves ample room for slippage between statements in natural versus formal language and between statements with theoretical as opposed to empirical content."
>
> "If mathiness were used infrequently to slow convergence to a new scientifc consensus, it would do localized, temporary damage. Unfortunately, the market for lemons[7] tells us that as the quantity increases, mathiness could do permanent damage because it takes costly effort to distinguish mathiness from mathematical theory."

Orthodox macroeconomics is found guilty of mathiness. Paul Romer himself (in the 2016 working paper "The Trouble With Macroeconomics", https://paulromer.net/trouble-with-macroeconomics-update/WP-Trouble.pdf), declares:

> "The trouble is not so much that macroeconomists say things that are inconsistent with the facts. The real trouble is that other economists do not care that the macroeconomists do not care about the facts. An indifferent tolerance of obvious error is even more corrosive to science than committed advocacy of error."

According to Romer, mainstream macroeconomics has become essentially indistinguishable from a pseudoscience, since efforts are put on developing increasingly complex and unfalsifiable mathematical models rather than collecting and understanding real-world evidence.

Keynes on economics

According to Google, "John Maynard Keynes (1883-1946) is widely considered the most influential economist of the 20th century due to his development of Keynesian economics, which fundamentally changed macroeconomics and economic policy. His theories, especially his advocacy for government intervention through fiscal policy (taxation and spending) to manage aggregate demand and combat recessions, became a cornerstone of post-World War II economic policy and continue to shape modern economic thought and institutions."

In a letter to colleague Roy F. Harrod, dated the 4th of July, 1938, Keynes explains his view on what economics is:

> "Economics is a science of thinking in terms of models joined to the art of choosing models which are relevant to the contemporary world. It is compelled to be this, because, unlike the typical natural science, the material to which it is applied is, in too many respects, not homogeneous through time. The object of a model is to segregate the semi-permanent or

[6] Romer, Paul M. (2015): "Mathiness in the Theory of Economic Growth", American Economic Review 105(5), 89-93. Paul Romer, former Chief Economist of the World Bank, was co-recipient of the 2018 Nobel Memorial Prize in Economic Sciences.
[7] In Economics, 'market for lemons' refers to markets where 'lemons' (low-quality goods) coexist with 'peaches' (high-quality goods) because it is difficult or costly to distinguish one from the other (second-hand car vs brand new car).

relatively constant factors from those which are transitory or fluctuating so as to develop a logical way of thinking about the latter, and of understanding the time sequences to which they give rise in particular cases. Good economists are scarce because the gift for using 'vigilant observation' to choose good models, although it does not require a highly specialised intellectual technique, appears to be a very rare one. In the second place, as against Robbins[8], economics is essentially a moral science and not a natural science. That is to say, it employs introspection and judgments of value."

In a second letter to Harrod[9], dated the 16th of July, 1938, on the similarities with the natural sciences and the use of statistical methods, Keynes added:

"In chemistry and physics and other natural sciences the object of experiment is to fill in the actual values of the various quantities and factors appearing in an equation or a formula; and the work when done is once and for all. In economics that is not the case, and to convert a model into a quantitative formula is to destroy its usefulness as an instrument of thought. Tinbergen[10] endeavours to work out the variable quantities in a particular case, or perhaps in the average of several particular cases, and he then suggests that the quantitative formula so obtained has general validity. Yet in fact, by filling in figures, which one can be quite sure will not apply next time, so far from increasing the value of his instrument, he has destroyed it. All the statisticians tend that way (…) The point needs emphasising because the art of thinking in terms of models is a difficult —largely because it is an unaccustomed— practice. The pseudo-analogy with the physical sciences leads directly counter to the habit of mind which is most important for an economist proper to acquire."

The Post-Keynesian school occupies a central position in heterodox economics. Google says:

"Post-Keynesian economics is a school of thought that extends the work of John Maynard Keynes by emphasizing that economies are demand-driven, operate within a state of fundamental uncertainty, and have endogenous money. It rejects mainstream economic assumptions of equilibrium and rational decision-making, instead focusing on the role of effective demand in determining employment and output, the importance of liquidity and investment, and the need for active government intervention to manage economic instability and promote full employment."

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[8] Lionel Robbins (1898-1984), in *An Essay on the Nature and Significance of Economic Science* (1932), Macmillan, proposed the definition of economics that mainstream textbooks have adopted: "Scarcity of means to satisfy given ends is an almost ubiquitous condition of human behaviour. Here, then, is the unity of subject of Economic Science, the forms assumed by human behaviour in disposing of scarce means (…) Economics is the science which studies human behaviour as a relationship between ends and scarce means which have alternative uses" (p. 15).

[9] This and previous letter can be found at https://philofecon.substack.com/p/two-letters-from-keynes-to-roy-harrod.

[10] The Dutch economist Jan Tinbergen (1903-1994) made foundational contributions to econometrics and was co-recipient in 1969 of the first Nobel Memorial Prize in Economic Sciences. The Tinbergen rule is a principle for economic policy: to use at least as many independent policy tools and policy targets (translation: a government should not expect to kill two birds with only one stone).

2. Macroeconomic approach to economic analysis: fallacy of composition and other fallacies

Does macro reduce to micro?

The Google answer on the rigour-reveleance debate also misses something when discussing rigour: from the orthodox perspective, rigour does not only cover the use of mathematical models but also how macroeconomic and microeconomic analysis are linked. Microeconomic analysis is limited to parts of an economy, without taking into account how the whole and the parts are related. Macroeconomic analysis takes the bird's eye view: it is a totality (the whole economy) that is analyzed (actually, the totality usually considered is a national economy, rather than the world economy).

A basic tenet in orthodoxy is that microeconomic analysis is fundamental, and that macroeconomic analysis derives from microeconomic analysis. 'Good macroeconomics', in that view, means 'macroeconomics with microfoundations'. This means that macroeconomics is not an independent discipline: it is just microeconomics made bigger by increasing the scale of analysis. As a result, macroeconomic models are actually microeconomic ones. Perhaps it is no coincidence that microeconomics was mathematized first (the 19th century marginal revolution) and is essentially indistinguishable from pure mathematics (a mathematician, without any academic economic training, is more qualified to conduct microeconomic theoretical research than an economist).

Heterodox economist have considered less relevant to built an alternative microeconomics, because dealing with, and understanding, macroeconomic troubles have been regarded as a more useful, and urgent, task. As a consequence, orthodox economists have found in orthodox microeconomics a solid ground upon to which built their rigouristic approach to macroeconomics. In addition, all the models, techniques and excuses developed in microeconomics can be easily transferred to macroeconomics, for which reason orthodox macroeconomics research could grow at a very high rate. By contrast, heterodox macroeconomics needs to start almost from scratch, perhaps without an accompanying microeconomic support. Intellectually, that creates the impression of inferiority or at least incompleteness in any heterodox approach in comparison with the orthodox one.

The heterodox main response is the claim that requiring microeconomic foundations for macroeconomic analysis may be a massive error. Heterodox economists resort to the fallacy of composition to justify that the legitimacy of studying the macroeconomic reality autonomously, without having to subordinate macro to microenomic analysis (in any case, implications work both ways: macroeconomic reality influences also the microeconomic one, as not everything is a simple matter of aggregating microeconomic realities).

Fallacy of composition

The fallacy of composition means automatically assuming that what is true at a lower scale (what is true for individuals or parts of an economy) is true at a higher scale (true for groups of individuals or the entire economy).

• **Example 1.** (From Google). "An example of the fallacy of composition in economics is the paradox of thrift, which argues that while it's beneficial for an individual to save more, if everyone saves more simultaneously, it can lead to lower aggregate demand, reduced production, and a worsening economic recession for the entire economy. This occurs because one person's spending is another person's income, so a decrease in spending across the whole economy means a decrease in overall income and economic activity".

• **Example 2.** If only one driver leaves home early to avoid a traffic jam, he avoids it; if everyone leaves early, the traffic jam is not avoided but occurs earlier.

In the two examples, a recommendation that could be successful at an individual scale need not be successful at a global scale. The fallacy relies on ignoring network effects, and network effects are first nature in an economy (it is not the same purchasing a phone when no one else has one than when most people have a phone). The fallacy of composition in financial regulations is presuming that if all the individual risks are kept under control, the entire financial system is safe. The fallacy ignores that even if all the banks are prudent, the system need not be safe.

Fallacy of division

The division fallacy means automatically assuming that what is true at a higher or aggregate scale (a group, the economy) is true at a lower scale (individuals or parts of the economy).

Examples: a cell is alive, but the molecules that compose it are not alive; brain activity generates consciousness, even though the neurons that make up the brain do not appear to be conscious.

Emergent property

A property of a system is said to be emergent when none of the components of the system have it. The existence of emergent properties explains the fallacies of composition and division: when moving from one scale to another, the property appears or disappears and causes the fallacy of applying the same reasoning in two cases: one with the property present and the other with the property absent.

The expression 'too big too fail' testifies to the existence of an emergent property. Typically, an economy is unaffected by the bankruptcy of a firm. But, mainly in the financial sector, some banks or financial institutions have become so large and interconnected that bankruptcy of one such financial actor could be catastrophic for the whole economy (not just the financial sector). In this case, public intervention (to prevent bankruptcy) seems justified. Unfortunately, the emergent property of becoming a private systemic actor, carries with it a moral hazard problem: given that the private systemic actor is aware of this condition, and that the government is most likely to come to the rescue in case of trouble, the actor has an incentive to abuse its privileged position (if risky plans go wrong, losses will be assumed by the public sector; if the plans succeed, profits are privately appropriated). *Time*'s person of the year 2009, the Federal Reserve president Ben Bernanke,

declared: "'Too big to fail is one of the biggest problems we face in this country" (see https://content.time.com/time/specials/packages/article/0,28804,1946375_1947251_1948043,00.html).

Changes of scale typically create new realities: if a company is losing money, the company has a problem; if all the companies in the economy are losing money, then the economy has a problem.

Simpson's paradox

Simpson's paradox occurs when a characteristic that is true for several groups turns false for the union of the groups. As an example, the table below shows three groups, two periods, and the tax rate (the ratio of taxes to income) for each group. The tax rate for each group decreases from $t = 1$ to $t = 2$, but, for the aggregate group, the tax rate increases from $t = 1$ to $t = 2$.

	period $t = 1$			period $t = 2$		
	taxes	income	tax rate	taxes	income	tax rate
group 1	5	100	**5%**	2	50	4%
group 2	150	1000	**15%**	63	450	14%
group 3	40	200	**20%**	255	1500	17%
all groups	195	1300	15%	320	2000	**16%**

The example makes evident that a valid microeconomic claim (each group pays a lower proportion of income) need not be macroeconomically true (in the aggregate a lower proportion is paid as well).

In view of Simpson's paradox and related results, heterodox economists contend that it makes sense to conduct macroeconomic analysis directly at the aggregate level without necessarily have to ground that analysis microeconomically.

***Cum hoc* fallacy**

The *cum hoc ergo propter hoc* ('with this, therefore because of this') fallacy consists of inferring causality from the proximity of events. The fallacy is committed when the existence of a statistical association between two variables is considered sufficient to declare the existence of a causal connection between them. Statistical correlation does not imply or prove causation. Feynman's cargo cult science seems to be an expression of the *cum hoc* fallacy, like perhaps all superstitious behaviour (which also could be considered related to the *post hoc* fallacy described next).

The existence of a 'common factor' may lead to fall into the fallacy. Suppose that people who suffer from anxiety smoke more than the average. Although it is tempting to infer that anxiety causes smoking, it could be that some genetic factor predisposes a person to simultaneously smoke and suffer from anxiety.

Reverse causality could also explain the *cum hoc* fallacy. Suppose that event B occurs whenever A occurs. This fact would not justify the conclusion that A causes B because B could also cause A. Is a country poor because it has a large population or does it have a large population because it is poor?

Is the public deficit growing because the economy is stagnating or is the economy stagnating because the deficit is growing? Is it a low-prestige university since students lack qualification or students lack qualification as a consequence of the university being low-prestige?

Post hoc fallacy

The *post hoc ergo propter hoc* ('after this, therefore because of this') fallacy consists of attributing causality to the order of events. The fallacy lies in assuming that, if event A precedes event B, then A causes B. To sustain the causal relationship from A to B, it would be necessary to identify what the connection (mechanism, sequence, process) is that leads from A to B.

- **Example 1.** A drop in the unemployment rate after a labour reform does not guarantee the conclusion that the reform was the cause of the drop in the unemployment rate.

- **Example 2.** Chicken and egg problems. In an economy, everything eventually affects everything else. This makes it difficult to establish what is cause and what is effect. Do more workers get hired because companies sell more, or do companies sell more because more workers have been hired? Do prices rise because consumers spend more, or do consumers spend more now because prices are rising and expect prices to continue rising in the future?

Prisoner's dilemma

A prisoner's dilemma game is a strategic situation where cooperation between participants generates a better outcome for everyone than competition. Orthodoxy has competition in high regard; heterodoxy emphasizes the virtues of cooperation.

The strategic decision model called 'game' is made up of three elements. First, the agents (called 'players') who have to make decisions. Second, for each player, the set of decisions (called 'strategies') that are available to them and from which they must choose one. And third, for each player and each vector indicating which strategy each player chooses, a numerical evaluation (called 'payoff') of the consequences that occur when the players choose the strategies specified in the vector. Payoffs can be anything: welfare measures, utility measures, money, grades, percentages, costs, profits, market shares, years in prison…

The game on the right is a prisoner's dilemma game. There are two players, 1 and 2. Each player chooses between strategies a and b (decisions to make or actions to take). What the strategies specifically represent is not relevant. The first component of each vector of numbers is player 1's payoff; the second number is player 2's. For instance, if player 1 chooses strategy b and player 2 chooses strategy a, then player 1 gets payoff 3 and player 2 gets payoff zero.

		player 2	
		a	b
player 1	a	2 2	0 3
	b	3 0	1 1

For each player, strategy b is a strongly dominant strategy: by choosing b, regardless of what the opponent chooses, the player gets a higher payoff. Consider, for example, player 1. If player 2 chooses a, 1's best bet is to choose b; and if player 2 chooses b, the best thing for 1 is to also choose b. This makes b a strongly dominant strategy for the player. If both players choose their dominant

strategies the outcome is (1, 1). This notwithstanding, there is one outcome where both receive a higher payout: the outcome obtained if both choose a.

- Prisoner's dilemma games illustrate the limits of assuming that selfish individuals make decisions that maximize collective welfare. Such games question the exclusive reliance on microeconomic analysis, where the invisible hand metaphor contends that selfish behaviour maximizes social welfare.
- Because players are likely to create institutions that help them cooperatively obtain the (2, 2) payoff vector, prisoner's dilemma games reveal that explaining aggregate outcomes only in terms of selfish competition may be inappropriate. Such games provide a rationale for agents (typically, public agents) to provide the public service of coordination (the orthodox position is that coordination is spontaneous and efficient enough).
- Unintended consequences of individual behavior may be the norm: in choosing dominant strategies, no one wanted an inefficient collective outcome, but the resulting outcome (1, 1) is inefficient (there is another payoff vector, (2, 2), where both players obtain a larger payoff). Again, on the face of it, public agencies are best suited to deal with unintended consequences of private sector activity.

El Farol bar problem

In *El Farol* bar problem, suggested by William Brian Arthur in 1994, 100 persons are independently planning whether to go to a bar. If more than 60 persons come, the experience is not fun; it is if at most 60 persons attend. Thus, everyone would like to stay away if the bar is overcrowed (with more than 60 persons) and would like to go to the bar otherwise.

The paradoxical result is that if everyone chooses the same strategy, the strategy fails in the sense that everyone would prefer to have selected the other strategy (it is fallacious to pretend that what works for one person, works for all persons). If all persons decide to go, the bar is overcrowded and, hence, they would have found preferable not to come. If all persons decide not to come, the bar is empty, for which reason each person would have liked to go. Consequently, if there is a 'natural' way of predicting what a person will do, the prediction will be self-defeating: if the prediction is that few will attend, then all will attend; if it is that all will attend, then no person will attend.

El Farol bar problem illustrates the limitations of a common strategy in orthodox macroeconomic analysis: to study the behaviour of a whole collective (all consumers, all firms) by presuming that the collective can be replaced by a single agent that represents the collective (the representative consumer, the representative firm). The representative agent model is one of the two cornerstone models used in advanced macroeconomic theoretical research (the other being the overlapping generations model). In fact, in many economic activities participants actively seek to differentiate themselves from the others as a strategy to outperform competitors. For this reason it appears inappropriate to neglect the heterogeneity of economic agents: not everybody is content with behaving just like the rest and, in consequence, they will reject 'one size fits all' solutions (orthodox economic policy advice is characterized by advocating one-size-fits-all measures).

Goodhart's law

Named after Charles Goodhart, former chief adviser to the Bank of England, Goodhart's law was originally formulated in 1975 as "Any observed statistical regularity tends to disappear when used for control".

Marilyn Strather's formulation is "When a measure becomes a target, it ceases to be a good measure." Mario Biagioli (in "Watch out for cheats in citation game", Nature 535 (7611), 201) offers the following definition: "When a feature of the economy is taken as an indicator of the economy, it inexorably ceases to function as such an indicator because people cheat on it."

Goodhart's law sets limits to what public policy can achieve and, therefore, invites heterodox economists to be cautious about the economic outcomes the public sector can effectively induce the private sector to achieve.

Goodhart's law expresses for the social world what Heisenberg's principle expresses for the physical world: measuring reality changes reality. By Goodhart's law, an empirical regularity should be expected to disappear if it is used to control the evolution of the variables to which the regularity refers.

- **Example 1.** Suppose it is an empirical regularity that students who attend more than 85% of the classes pass. To save preparing, writing, correcting and marking exams, a teacher could use the regularity to monitor attendance and pass students who attend at least 85% of the classes. If students are aware of this policy, attendance will no longer be a good measure of the students' academic performance.

- **Example 2.** Lucas's critique. Formulated by 'Nobel Prize in Economics' Robert Lucas Jr., the critique points out that policy changes can modify the coefficients in the macroeconometric models used to formulate policies, so that policies designed to have effects on one reality (reality without the policy) end up affecting a different reality (reality with the policy). Thus, the design of all policy measures must take into account how the measures alter reality, which then was rarely the case (and most likely still is the case).

- **Example 3.** Exams are indicators of knowledge. Exams are not ends, but means. The fact is, however, that the existence of exams encourages students to devote more attention and effort to passing exams than to learning the assessed content in depth. Result: knowing that one has to take exams, exams no longer aptly measure what one learns in a subject, but the ability to pass exams.

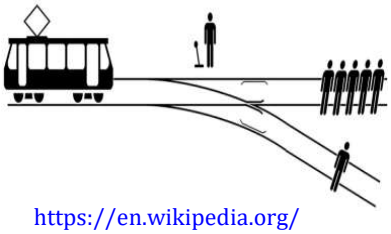
- **Example 4.** The most relevant scientific contributions tend to be widely cited. Making citations an indicator of their quality encourages researchers to do whatever it takes to inflate the citations they receive (see Biagioli above) without worrying about quality.

When a government uses an empirical economic regularity as a policy tool, the regularity will tend to disappear. Empirical regularities connect variables (attendance and academic performance in Example 1, citations and research quality in Example 4). If one of the variables is taken as the target (performance, quality), the other variables (attendance, citations) can act as indicators. But taking the indicator as a measure of the target invalidates the indicator: controlling the indicator instead of the target will probably destroy the empirical regularity, because people will tend to base their decisions on the indicator and not the target.

• **Example 5** (http://lesswrong.com/lw/1ws/the_importance_of_goodharts_law/). Very popular (real?) example to illustrate Goodhart's law. Soviet factories, when assigned targets in number of keys, produced many very small and useless keys; and when targets were set in weight, they produced a few gigantic keys. Number of keys and weight were well correlated before planning. By becoming targets, they lost this correlation.

The trolley problem

Philippa Foot suggested in "The Problem of Abortion and the Doctrine of the Double Effect" (1967) the following situation. A runaway tram is heading towards five persons (five workers on the track). The only way of saving their lives is to pull a lever that will divert the tram to another track, but at the cost of killing another person. Would you turn the tram? Should you?



https://en.wikipedia.org/wiki/Trolley_problem

• **Solution 1: consequentialism.** Consequentialism is the ethical doctrine that judges (the morality of) actions by their consequences. The Spock character in the Star Trek franchise was consequentialist: "The needs of the many outweigh the needs of the few or the one," *Star Trek II: The Wrath of Khan* (1982). Since having five deaths seems a worse consequence than having only one, consequentialism recommends pulling the lever to divert the tram.

• **Solution 2: deontological ethics (deontology).** Deontology is the ethical doctrine that judges actions by their by conformity with pre-established rules: moral actions should conform to duty. It is not only the consequences of actions that matter but also the principles that govern them. If people abide by the Decalogue, the commandment 'Thou shalt not kill' forbids pulling the lever.

• **Example 1. Alternative scenario of the trolley problem.** You are on footbridge with a fat man just above the track leading to the five persons. The only possibility of saving them is to derail the tram by pushing the fat man and making him drop onto the track. Should the man be sacrificed?

• **Example 2.** The design of economic policies faces trolley problems. Alternative policy measures lead to different economic outcomes. In general, some outcomes are favourable to some people and, simultaneously, detrimental to other people. A high interest rate is more beneficial to lenders than a lower one, as they receive more for lending money. Yet, borrowers are worse off with a higher than with a lower interest rate, since they have to pay more for getting a loan of money.

The Jevons paradox

"It is wholly a confusion of ideas to suppose that the economical use of fuel is equivalent to a diminished consumption. The very contrary is the truth."

William Stanley Jevons (1865): *The coal question.*

• **Remark 1.** Jevons argued that if some technological advance allowed a blast furnace to produce iron using less coal, then profits would go up, investment in iron production would be attracted, the price of iron would fall, and demand for coal would be stimulated. The technological improvement making it possible to produce iron with less coal (more efficiently) would increase the

total consumption of coal: even if each furnace diminishes the consumption of coal, the larger number of furnaces created by the new investments increases total consumption of coal.

• **Remark 2.** Jevons' reasoning can be adapted to any resource, like oil. Suppose an industry learns to use a resource more efficiently: less amount needed to produce the same output. The price of the resource may decrease, as it becomes less necessary. The price fall might cause an aggregate increase in the use of the resource (new firms enter the industry or the resource is more used in other industries). As for oil, new methods for producing using less oil may not stimulate the adoption of alternative energy sources, but rather the opposite: oil could be more intensely consumed. (See David Owen (2012): *How scientific innovation can make climate problems worse*).

The Matthew effect

Coined by Robert K. Merton, the term refers to the fact (i) that eminent scientist appear to receive excessive credit in comparison to less well-known researchers, without the latter's work being significantly inferior in quality and (ii) that credit tends to be concentrated on famous researchers.

• **Remark.** By extension, the terms is also used to denote the phenomenon by which those having an advantage (fame, status, reputation, wealth) are more likely to accumulate more of that advantage. The Matthew effect is often identified with the expression "the rich get richer and the poor get poorer." ("For unto every one that hath shall be given, and he shall have abundance: but from him that hath not shall be taken even that which he hath." Matthew 25:29, King James Bible, https://en.wikisource.org/wiki/Bible_(King_James)/Matthew#25:29)

The Red Queen effect

Derived from a passage in Lewis Carroll's *Through the Looking-Glass* ('it takes all the running you can do, to keep in the same place') the Red Queen effect is the phenomenon according to which it is costly to simply stay in the same situation.

• **Example.** Firms have to invest in publicity just not to lose clients or market share. In an arms' race, one country must rise its military expenditure merely to not lag behind the rival country. In an escalator going down, you must walk up to remain stationary with respect to the ground. If predators evolve to become more lethal, preys need also evolve simply to survive.

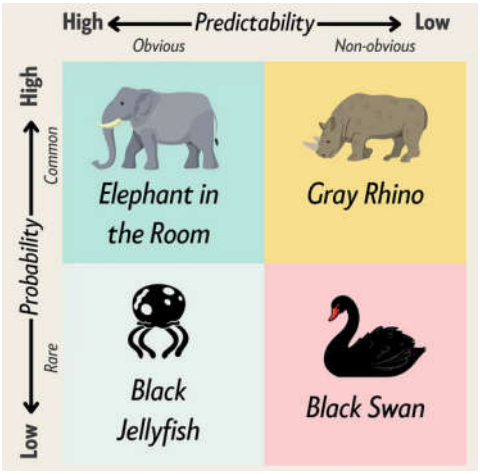
The animal risk matrix

Jain[11] (2025) classifies, in the form of the animal risk matrix next, four animal metaphors that describe types of risks, events or problems.

- The elephant in the room. This metaphor refers to a generally know but ignored problem or risk. In any collective (firm, economy, political institution…), the elephant in the room is an evident, imminent, pressing problem that nobody dares, is interested or motivated to address because

[11] Jain, Gaurav (2025): "The Animal Risk Matrix: How to Spot, Prioritize, and Manage Risks Like a Pro. Risk Management Lessons From the Wild", https://www.thegoodboss.com/p/the-animal-risk-matrix-how-to-spot.

addressing it is uncomfortable. Elephants tend to grow bigger with time, yet it seems that everyone expects them to vanish spontaneously.



- The black swan (Nassim Nicholas Taleb[12]). A black swan is a rare, infrequent, high-impact event of great impact and retrospectively (but not prospectively) explainable/predictable. A black swan is an unlikely event whose occurence produces tectonic effects. Pandemics, remarkable discoveries or innovations, global crises... qualify as black swan events: rare, big impact, unforeseeable.
- The gray rhino (Michele Wucker[13]). A gray rhino is a very likely event or risk that tends to be ignored. As for problems, a gray rhino is one that is easily identified yet gets no sufficient attention or is underestimated. The gray rhino is a metphor for things that go wrong despite being avoidable. Examples: climate change, cybersecurity threats, toxic workplace culture, unhealthy diet or life style…
- The black jellyfish. A black jellyfish represents a predictable and rare event, problem or risk typically ignored. An anticipated problem not getting sufficient attention because it is considered unlikely. The solution to black jellyfish problems tends to be postponed as they are not perceived as serious, but with time black jellyfish problems become more costly to solve. Regulatory changes is an example of a black jellyfish. Jain (2025) explains the metaphor as follows:

  > "In 2011, a nuclear power plant in Japan had to shut down—not because of an earthquake or tsunami, but because jellyfish clogged the cooling water intake (…) Similar shutdowns have happened in Sweden, US, and Scotland. In all these incidents, it was found that rising temperatures due to climate change created favorable conditions for the jellyfish populations to increase rapidly. Who could have imagined?"

[12] Taleb, Nassim Nicholas (2007): *The Black Swan: The Impact of the Highly Improbable*, Allen Lane.

[13] Wucker, Michele (2016): *The Gray Rhino: How to Recognize and Act on the Obvious Dangers We Ignore*, Macmillan.

3. Three main players: finance, government, business

Big players

The contents of this course are organized around the three most powerful economic actors ('actors' understood in a broad, collective sense). As an oversimplification, most of what takes place in an economy is related to what financial institutions, the government and big corporations do (or intend to do).

Economy = financial sector + real sector

An economy can be simplified to two elements: the transactions that occur (what is bought and sold, who buys and who sells) and the outcomes of those transactions (the price at which sales and purchases take place, and the amount bought and sold). There are two basic transactions: financial transactions and real transactions.

Financial transactions consist of the purchase and sale of financial assets. The financial sector of an economy includes all financial transactions and associated activities (like the creation and the liquididation of financial assets). Transactions and activities not exclusively involving financial assets (the real transactions) made up the real sector of the economy (essentially, the production, exchange and consumption of goods, bads and services).

Financial asset

A financial asset is a monetary right of someone over someone else. A financial asset is a kind of I.O.U. ('I owe you'). An I.O.U. is a promissory note: the acknowledgement of a debt of money. A financial asset materializes a promise to pay money in the future. Loosely speaking, a financial asset is a (direct or indirect) loan of money: the buyer of a financial asset extends credit (lends money) to the seller of the financial asset.

Any financial asset expresses a relationship between two parties: lender (creditor, saver) and borrower (debtor, investor/consumer). At the same time, a financial asset (which could also be called a 'financial liability') represents an obligation (to the one who creates the asset in favor of the one who buys it) and a right (in favour of the one who buys the asset over the one who creates it).

Financial assets are instruments to channel money (to make and receive a loan of money) from those who wish to lend to those who wish to borrow. Those wishing to borrow have a deficit: their planned expenditure is larger than their current income, so they would like to use now future savings. For those wishing to lend, planned expenditure is smaller than current income: they have a surplus and would like to save it for future use.

Examples of financial assets

A bank deposit is a financial asset: the customer has the right to use the deposit to make payments and the bank is obliged to attend the customer's request to use the deposit to make payments.

A Treasury bill (T-bill, for short) is a financial asset created by a government to finance an excess of expenditure over revenue. In Spain, a T-bill is a promise to pay €1000 in the future (in 3, 6, 12 or 18 months) to the owner of the bill.

A bank loan is a financial asset: the loan represents the borrower's obligation to fulfil a financial obligation and simultaneously represents a monetary right of the bank on the borrower. In everyday speech, 'loan' is used to designate both the credit that the bank provides to the borrower (the 'loan of money') and the borrower's obligation to repay the loan of money. In reality, the financial transaction when a bank grants a credit involves the exchange of two financial assets: the bank, as the lender, delivers a financial asset called 'deposit' to the borrower; and the borrower delivers to the bank a financial asset called 'loan'.

Interest rates

With each financial asset there is an associated interest rate, which measures the profitability of purchasing the asset.

For instance, T-bills are initially sold at a discount: a T-bill promises to pay in the future a certain amount V (the nominal or face value of the T-bill) but, when issued, it is sold (in normal cirumstances) at a price P smaller than V. The ratio between the profit $V - P$ and what is paid, P, to get the profit is the interest rate of the T-bill.

$$i_{T-bill} = \frac{V - P}{P}$$

The formula expresses the interest rate in per one terms; to get a percentage, the formula must be multiplied by 100. For instance, purchasing a T-bill with face value 1000 EUR for 800 EUR yields an interest rate

$$i_{T-bill} = \frac{V - P}{P} = \frac{1000 - 800}{800} = \frac{1}{4}$$

which is a 25% interest rate (a payment of 800 ensures a 200 profit).

'The' interest rate of an economy

With milions of financial assets, there are milions of interest rates as well in an economy. Since they all tend to move, more or less, in parallel, the fiction is that an average or representative interest rate for the economy can be defint. Roughly speaking, 'the' interest rate for the economy can be interpreted as the average price of borrowing money (the domestic price of money).

Wealth

Goods and services represent wealth (macroeconomic accounting is deficient in that bads are rarely counted). Wealth (understood in an economic sense: economic wealth) means ability to satisfy some need or having some intrinsic value (there is no better definition).

Financial assets are not wealth; they are instead referred as 'financial wealth'. Financial wealth means monetary value. Money is not (economic) wealth, because, in general, money has no intrinsic value or satisfies no need. Money is used to acquire wealth, but in itself it is not wealth. This interpretation contradicts the popular view that identifies money with wealth, which falls into the fallacy of composition: at an individual level, money can be equated with wealth, but not at a macroeconomic level.

Economy = private sector + public sector + foreign sector

Based on who carries out economic activity (or go through with transactions), an economy can be segmented into three sectors: private, public and foreign.

- Private sector, which includes all economic activity (real or financial) carried out by households, businesses and banks. The private sector can be subdivided into the banking private sector (banks) and the non-banking private sector (households and businesses).
- Public sector, which includes all the economic activity (real or financial) of local, regional and national public administrations.
- Foreign sector, which groups together all the economic activity of the private and public sectors of the rest of the economies linked with the domestic private or domestic public sectors.

The two partitions of an economy can be combined, so that the private real sector (real economic activity of households, companies or banks) can be separated from the private financial sector (financial economic activity of households, companies or banks).

The real sector: GDP

The orthodox view regards the financial sector as eventually irrelevant: financial activity is just a facilitator of real activity. Hence, an economy can be reduced to its real sector. And if the real sector had to be reduced to a number, it would be GDP.

GDP (Gross Domestic Product) is an estimate of the value of the production of goods and services used for consumption in an economy over a period of time. It is interpreted as a measure of the size of the real sector: the higher the GDP, the 'larger' the real sector. Mainstream economists consider the evolution of GDP a good indicator of the 'health' of the real sector (and, by extension, of the economy). A growing GDP (positive GDP growth rate) suggests a healthy economy; an economy with a decreasing or stagnating GDP (negative or zero GDP growth rate) is declared to be in bad shape.

Business cycle

The expression 'business cycle' refers to oscillations in GDP: one of the few regularities of the real sector of an economy is that its GDP fluctuates. For some periods, GDP grows (and the economy is said to expand or that it is booming or that it is in the expansionary phase of the business cycle). For some others, GDP falls (the economy contracts, enters into a recession or is in the contractionary phase of the business cycle). A depression is a sufficiently intense or long recession.

The real sector: inflation rate

In the orthodox view another macroeconomic variable that describes and summarizes the behaviour of the real sector is 'the' inflation rate (multiple inflation rates can be defined, but attention is focused on just one).

The inflation rate is the rate of change of a consumer price index measuring how, on the aggregate, the prices of the goods and services characteristically purchased in the economy change during a

given period of time. By defining other general price indices (that is, ways of aggregating the prices at which real transactions take place), more inflation rates could be manufactured.

Inflation rates are interpreted as measures of the productive capacity of the real sector to meet the total demand for goods and services. High and increasing inflation rates suggest that the real sector is approaching the limit of its capacity to meet aggregate demand (available productive resources are being exhausted) and the lower capacity is manifested in growth (and/or acceleration of growth) of price indices.

The phenomenon of inflation is said to occur (during a certain period of time) when (during that period) the inflation rate is positive (indicating a rise in the general price level of goods and services —bear in mind the price of financial assets (asset inflation or deflation) does not directly affect the inflation rate). Deflation is the opposite phenomenon: if, during a certain period, the inflation rate is negative, there is deflation during that period. Reflation occurs (during a certain period) if (during that period) the inflation rate tends to rise. Disinflation is the opposite to reflation: a tendency for the inflation rate to fall. A hyperinflation is a reflation in which the value of the inflation rate are sufficiently high (a monthly inflation rate of at least around 50%). A stagflation takes place when an economy experiences, at the same time, inflation and recession (or even inflation and stagnation).

The real sector: employment and unemployment rate

An orthodox mind does not pay much attention to employment or to unemployment. The most radical mainstream macroeconomists declare all unemployment to be voluntary. Contrariwise, for a heterodox macroeconomist the most serious illness of an economy is unemployment (if only because of the psychological effects of being unemployed and the disturbances it creates on one's life: remind the motto that, for heterodoxy, people come first, not 'the economy').

The number of people with jobs (employment) and the proportion of people without jobs (and who are looking for them) in relation to the potential number of people with jobs (unemployment rate or jobless rate) are real sector magnitudes that are interpreted as indicators of the good or bad functioning, respectively, of the real sector.

A young heterodox school, Modern Monetary Theory, has suggested the job guarantee proposal[14]: a government should serve as the employer of last resort by giving a job to every person not having one in the private sector and asking for one. The person must be willing and able to work and the government promises to pay a salary that covers all basic needs.

It is important in macroeconomics to compare economies. Comparison is in general not meaningful when macroeconomic magnitudes (aggregate production, price indices, volume of unemployed persons…) are absolute. For example, comparing total unemployment in Spain and China does not amount to much. That is why attention in macroeconomic analysis tends to focus on relative magnitudes, typically a rate of change (as the inflation rate), but also a relative price (such as the exchange, that prices one currency in terms of a another one) or a ratio (as the interest rate). Except

[14] For instance, take a look at Mitchell, William (2022): "Exploring the essence of MMT – the Job Guarantee – Part 2", https://billmitchell.org/blog/?p=49546.

for relative prices, relative macroeconomic magnitudes enjoy a property facilitating international comparison: they lack units.

In view of this, regarding unemployment, the characteristic variable of interest is the unemployment rate (despite the fact that this variables could be misleading: a fall in the unemployment rate is compatible with a rise in unemployment):

$$unemployment\ rate = \frac{number\ of\ people\ not\ having\ a\ job\ and\ looking\ for\ one}{number\ of\ people\ ready, willing\ and\ able\ to\ take\ a\ job}.$$

The above is a general definition. There is some discretion as to how specifically 'not having a job' or 'able to take a job' is defined.

Basic summary of the real sector

Conventionally, the analysis of an economy is (when attention is restricted to the 'short run' of an economy: up to a couple of years) reduced to trace the evolution of three rates in the real sector:

- the GDP growth rate (the rate of change of GDP in a quarter or a year);
- the inflation rate (the rate of change of a consumer price index, monthly or annually); and
- the unemployment rate (at a specific date[15]).

Fig. 1 on the next page, taken from https://tradingeconomics.com/matrix, exhibits the information (only for top-sized economies) considered essential to describe the current state of an economy.

The last (9th) column, population, is useful to make the GDP figures internationally comparable in terms of the relative dimension of economies. Orthodox macroeconomists regard

$$GDP\ per\ capita = \frac{GDP}{population}$$

as a macroeconomic magnitude strongly and positively correlated with the level of economic development: 'rich' countries are those with high GDP per capita. In mainstream macroeconomics 'the wealth of nations' is identified with their GDP per capita. For long run analysis (decades, generations), orthodox macroeconomists focus almost exclusively on the evolution of GDP per capita: that is, in their approach, the main (if not the only) measure of 'economic success'.

This course sets aside medium and long run considerations and is limited to short run analysis.

The 8th column, current account, is, loosely speaking, the difference between the domestic GDP bought by foreigners (domestic GDP being consumed in another economy) and the foreign GDP

[15] GDP and the inflation rate are flow variables: variables measured per unit of time. It does not make to refer to a GDP figure without specifying the period of time to which the variable refer. Obviously, the same GDP figure has a different meaning if it has been generated in a quarter or in a year. Unemployment, employment and employment rates are instead stock variables: variables measured at a point in time but whose units are not explicitly time-dependent. Heterodox economists blame orthodox ones for a careless use of flow and stock variables: the distinction is not always respected when building or interpreting models (for example, by equating a flow with a stock variable).

bought by members of the domestic economy. The current account runs a surplus is the difference is positive: exports (GDP leaving the economy) higher than imports (GDP entering the economy). A deficit is run in the opposite case. Orthodox economists frown upon a current account deficit.

Country	GDP	GDP Growth	Interest Rate	Inflation Rate	Jobless Rate	Gov. Budget	Debt/GDP	Current Account	Population
United States	29185	3.30	4.25	2.90	4.30	-6.40	124.30	-3.90	341.15
China	18744	1.10	3.00	-0.40	5.30	-6.50	88.30	2.20	1408.00
Euro Area	16406	0.10	2.15	2.00	6.20	-3.10	87.40	2.60	351.38
Germany	4660	-0.30	2.15	2.20	6.30	-2.80	62.50	5.70	83.60
Japan	4026	0.50	0.50	2.70	2.30	-2.30	236.70	4.70	120.65
India	3913	1.70	5.50	2.07	5.10	-4.80	81.92	-0.60	1398.60
United Kingdom	3644	0.30	4.00	3.80	4.70	-4.80	95.90	-2.70	69.23
France	3162	0.30	2.15	0.90	7.50	-5.80	113.00	0.40	68.44
Italy	2373	-0.10	2.15	1.60	6.00	-3.40	135.30	1.10	58.93
Canada	2241	-0.40	2.50	1.90	7.10	-2.10	110.80	-1.00	41.53
Brazil	2179	0.40	15.00	5.13	5.60	-8.50	76.50	-2.55	212.58
Russia	2174	-0.80	17.00	8.10	2.20	-1.70	16.40	2.90	146.20
Mexico	1853	0.60	7.75	3.57	2.80	-5.70	49.70	-0.80	130.86
Australia	1752	0.60	3.60	2.10	4.20	0.60	43.80	-2.00	27.40
Spain	1723	0.70	2.15	2.70	10.29	-3.20	101.80	3.10	49.08
South Korea	1713	0.70	2.50	1.70	2.60	-3.90	46.80	5.30	51.75
Indonesia	1396	4.04	4.75	2.31	4.76	-2.30	38.80	-0.63	281.60
Turkey	1323	1.60	40.50	32.95	8.00	-4.90	24.70	-0.80	85.67
Saudi Arabia	1238	1.70	4.75	2.30	2.80	-2.80	26.20	-0.50	35.30
Netherlands	1228	0.10	2.15	2.80	3.90	-1.10	43.70	9.10	18.04
Switzerland	937	0.10	0.00	0.20	2.80	0.60	37.60	5.10	9.05
Poland	915	0.80	4.75	2.90	5.40	-6.60	55.30	0.00	36.50
Taiwan	757	3.05	2.00	1.60	3.33	0.40	28.20	15.70	23.40
Belgium	665	0.20	2.15	1.91	5.80	-4.50	104.70	-0.90	11.90
Argentina	633	-0.10	29.00	33.60	7.60	-4.37	83.20	0.60	47.07
Sweden	610	0.50	2.00	1.10	8.40	-1.50	33.50	6.00	10.59
Ireland	577	0.20	2.15	2.00	4.70	4.10	38.80	17.20	5.44
Singapore	547	1.40	1.11	0.60	2.00	-1.60	173.10	17.50	6.04
Israel	540	-1.00	4.50	2.90	2.90	-6.80	69.00	3.20	9.97
United Arab Emirates	537	2.00	4.15	2.43	2.13	4.50	32.10	9.30	10.88
Thailand	526	0.60	1.50	-0.79	0.91	-2.20	63.70	1.40	66.05

https://tradingeconomics.com

Fig. 1. Basic macroeconomic magnitudes of economies ranked by GDP size

Some heterodox economists question the interpretation that GDP leaving the economy should be considered a positive or desirable outcome: this is goods and/or services produced in the economy but consumed abroad. So foreign consumers enjoy the sacrifices made by domestic producers: 'what is positive in that?', they ask.

The 3rd column provides information on the financial sector: the official interest rate (set by the central bank, a topic discussed soon), which is a proxy for the cost of borrowing money in the economy (equivalently, the reward for lending money). Columns 1 (GDP, measured for all economies in US dollars), 2 (GDP growth rate), 4 (inflation rate) and 5 (unemployment or jobless rate) summarize the real sector (as a gross simplification, what businesses do).

Lastly, columns 6 and 7 provide government information. Column 6 is a measure of the government budget balance ('the public deficit'): it is positive (in surplus) if revenues collected are higher than expenses incurred; it is negative (the budget is in deficit) in the opposite case. The figure is a relative magnitude, again to make international comparison meaningful: the variable measuring the government budget balance is the ratio between public deficit and GDP expressed as a percentage. This ratio tells what proportion of GDP the government has taken in excess (if there is a public deficit) or is contributing in excess (if there is a public surplus, which is rare).

Heterodox economists (fundamentally those belonging to the Modern Monetary Theory school, MMT) claim that it is ridiculous for a government to run a budget surplus. On the contrary, most orthodox economists claim that is ridiculous for a government to run a budget deficit (at least, chronically). One defining trait of orthodoxy is fiscal austerity: a government should operate like a family, in the sense of not 'living beyond its means' and, therefore, not spending more than its income. According to MMT, there is a big difference between households and governments: a household is a money user, whereas a government (unless it decides the opposite, as the eurozone members) is a money issuer. This means that a family cannot create money to pay their debts, while a government can (and typically does).

Column 7 quantifies the government debt; that is, public deficit accumulated in previous years. Once more, the number is a GDP percentage. Membership to the eurozone demands respecting two fiscal rules: annual public deficit not larger than 3% of GDP and outstanding public debt not larger than 60% of GDP (observe: deficit is a flow variable; debt is a stock variable).

Orthodox research has systematically tried to empirically demonstrate that some public debt figures are untenable: that economic contraction follows after trespassing some public debt threshold. For decades, Japan public debt to GDP ratio has been, by orthodox standards, astronomic. It is currently the highest in the developed world (Sudan tops the list) and second highest in the world, at around 235%. No one is expecting the Japanese economy to collapse. The US government runs nearly a 125% debt-to-GDP ratio and the US economy is still the leading economy in the world (World Bank data assigns 27% of world GDP to the US economy; see https://tradingeconomics.com/united-states/gdp). Orthodoxy seems to miss the mark regarding macroeconomic (fiscal) policy.

Macroeconomic policy

In essence, the orthodox view contends that the private sector works economically sufficiently well most of the time when left by itself: this is the microeconomic 'invisible hand' idea operating at the macroeconomic level. It is accepted in some stream of thought in orthodoxy that some macropolicy is often needed to stabilize the macroeconomic behaviour of the private sector, but in any case that intervention ought to be specific and temporal.

The central bank and the government are the two main agents of macroeconomic policy. The central bank decides and executes monetary policy (measures to regulate the 'amount of money'[16] and/or the interest rate) and thereby intervenes in the financial sector. The government decides and executes fiscal policy (measures affecting the government budget; that is, measures affecting taxes, public expenditure or transfers) and therefore the government typically intervenes in the real sector.

MMT rejects the mainstream view that government should act like households. In particular, MMT adherents conted that the aim of taxation is generally not to raise revenue but to reduce the spending capacity in the economy. In MMT a sovereign government (one who has its own currency) is not financially constrained: this kind of government can create money to pay debts (as long as those debts are denominated in the domestic currency). Eurozone members have given up that option. Most governments possess their own central bank (the US, the UK, China, Australia, Japan, Canada…), to which they could resort to pay the public debt; contrariwise, eurozone members have no central bank on their own (the European Central Bank is associated with no government and, worse still, by law is forbidden to rescue governments by financing their public debt).

Mainstream macroeconomic textbooks restrict attention to just two kinds of macroeconomic policy: monetary policy (which is considered fundamental to guarantee enough GDP growth to keep the unemployment rate low and stabilize the inflation rate) and fiscal policy (whose main goal is to not create trouble to businesses and finance, which means austerity: very low or zero public deficit, or even a mild surplus, and public debt as small as possible).

Governments have always implemented at least a third king of policy, but almost unnoticedly: industrial policy. Mainstream economics, at least since the 1970s, has abandoned industrial policy research. The excuse: the thesis that the best industrial policy is having no industrial policy at all. Recently, as a result of the global shocks associated with the 2008 global financial crisis, the 2020 pandemic and the 2022 geopolitical tensions caused by the Russian invasion of Ukraine, a general trend has emerged, or at least become more evident: the return of industrial policy, with the aim of inducing structural transformations in the economy (which rarely occur spontaneously, like the green transition, digital transformation or stopping/reverting global warming) and that are deemed necessary to neutralize the negative domestic economic effects of global changes.

The 'horrific trinity'

The triad GDP—inflation—unemployment can be seen as a quantification of the triad wealth—money—work. An economy is essentially about providing for the needs and wants of people, that is, about generating wealth (goods and services). For that, work is instrumental, since wealth is not spontaneously created. Lastly, money is also

[16] The term 'liquidity' is, in broad terms, synonymous with 'amount of money'. 'Liquidity' is a property of money and all financial assets considered to be sufficiently equivalent to money. A bank deposit is a financial asset taken to be as good as money for practical purposes (taxes and purchases can be paid with deposits). Money is a special kind of financial asset (one having maximum liquidity). Conversely, all financial assets could be regarded as more or less good money imitators: more or less imperfect forms of money (the closer the financial asset to money, the more liquid the asset). So quintessential is liquidity for money that the two terms can be easily equated: moneyness is being maximally liquid and that is why 'liquidity in an economy' comes to mean 'everything as liquid as money'. In general, the more liquid an asset (financial or real, like a house), the easier it is to sell the asset (that is, to transform it into money).

instrumental in facilitating the transformation of work into wealth (inflation is a sort of measure of how well money performs its functions). Money defines the financial sector of the economy, whereas the real sector is concerned with wealth and work.

Each part of the economy associated with a member of the triad wealth—money—work is expected to be able to perform its intended function satisfactorily: the real sector is supposed to create enough wealth and work; the financial sector, enough (and safe) money. Yet, each part may also malfunction. The worst-case scenario gives rise to the 'horrific trinity' shown in Fig. 2, which captures problems heterodox economists perceive in the working of economies.

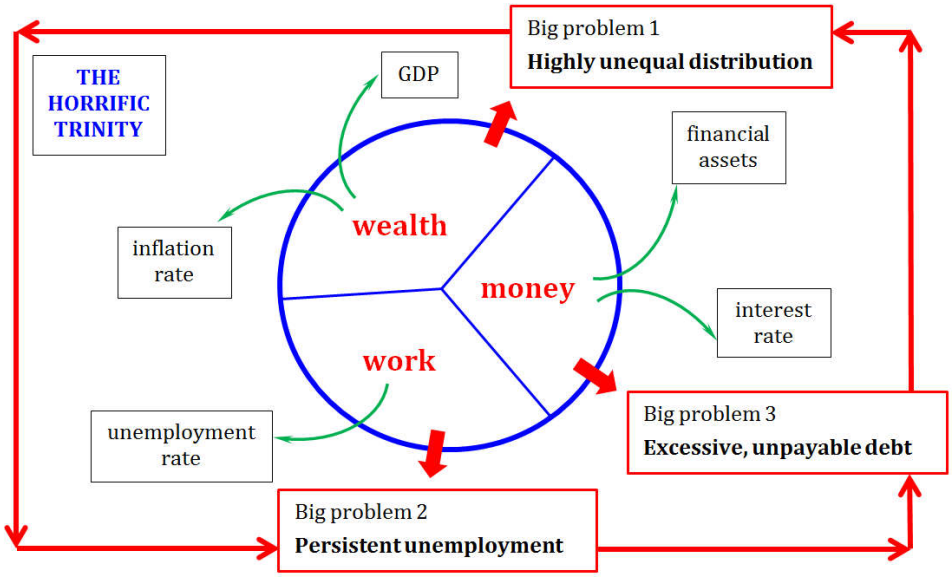


Fig. 2. The horrific trinity of inequality, unemployment and too much debt

A highly unequal (and increasing unequal) distribution of wealth is the severe illness that affects the wealth-generating economic processes. Persistent unemployment is the one affecting the job-generating economic processes. And the money-generating processes easily cause an accumulation of excessive (and eventually unpayable) debt (financial crises are a recurrent phenomenon and all of them are associated with excessive private debt).

These troubles self-reproduce because they are mutually reinforcing: high and increasing inequality contributes to increase the size of the financial against the real sector; a smaller real sector creates fewer opportunities to get a job; the poorer groups and the unemployed need to resort to debt to compensate for the insufficient income; and the richer groups, preferring getting income from the financial rather than the real sector, add more fuel to the fire of debt accumulation.

Heterodox economists attribute to the government the responsibility for dealing with those problems: taxation (fiscal policy) brings back a fairer wealth distribution; job guarantee public programmes (and some industrial policy) can easily put an end to persistent unemployment; proper financial regulation and strict supervision of financial institutions prevent debt escalation (adopting a people-centered monetary policy that cares more about the 99% than the 1% and not letting that policy exclusively in the hands of central banks, who nowadays are accountable to nobody).