ECON 133: Global Inequality and Growth
Section #5: Inflation and inequality

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What is the distributional incidence of inflation?

The US has experienced a period of marked inflation over the past year, with considerable debate over the source of the inflation and how long it will last. Today's section will delve into a tangential question that is very pertinent for our discussion on inequality. What is the distributional incidence of inflation? I.e. If we think about the impacts of inflation on peoples' incomes, is inflation distributionally *progressive*, *regressive*, or *neutral*?[1] The goal of today's lecture is to inform you on this discussion and to get you thinking about how to answer this question, and maybe render you opinionated about the subject.

What is inflation?

- Inflation is the change in the price index over time.
- A simple definition of a price index at time t_1 relative to time t_0 :

$$\frac{\sum_{i\in\mathcal{I}} p_{i,t_1} q_{i,t_0}}{\sum_{i\in\mathcal{I}} p_{i,t_0} q_{i,t_0}},$$

For a set of goods $i \in \mathcal{I}$, each purchased at quantity $q_{i,t}$ at price $p_{i,t}$ at time t. This specific version is called the Laspeyres index. There are other versions of price indices that represent slightly different ways of asking the same question: what is the cost of a basket of goods, and how does this cost change over time? The main point of contention is *which* basket of goods to include. The Laspeyres index anchors the basket of goods and quantities to those consumed in period t_0. Another popular index, the Paasche price index fixes the basket of goods and quantities to those purchased in t_1.

However, there is considerable non-triviality over *which* goods are included. Technological change and competition induces the creation of new goods and the destruction of old goods all the time. How do we incorporate quality changes that effectively render the cost of goods lower? E.g. paying USD $1,000$ for a laptop with 32gb of RAM but then two years later paying the same (inflation adjusted amount) for a laptop with 64gb of RAM? A common critique is that naively-designed price indices overstate the cost of living because technological increases continuously decrease costs and increase quality/living standards.

A lot of people are interested in these questions, and a lot of people have developed frameworks for accounting for these different kinds of changes in calculating price indices. But let's put that discussion aside for now.

[1] SPOILER: no one knows for sure, but a lot of people have very strong feelings. Even more people don't have very strong feelings about it—because it's very complicated (and because of apathy).

High inflation, not hyperinflation, not deflation

Let's restrict our discussion a little bit. Here we are talking about the distributional incidence of high inflation, as opposed to the low inflation that central banks normally target at around 2% per year. 2% inflation is generally considered optimal from the perspective of accommodating population growth and increased demand for money.

We are currently experiencing annual rate of inflation of around 7%, which is high, but is quite different from the phenomenon of hyper inflation, which is (arbitrarily) defined as inflation of 50% per month, or about 13000% per year. That is a different beast, which we aren't discussing. The high inflation we are discussing is also different from deflation, which refers to negative price changes between periods. We aren't talking about deflation here, but deflation is typically considered harmful from a macroeconomic perspective because consumer expectations of continuously decreasing pricing encourages hoarding and discourages spending. Both of these other phenomena cause larger general equilibrium effects that can increase unemployment and foment recessions.

Baseline: what does inflation *do*?

1. Inflation reduces the purchasing power of currency. Your grandpa complains how a loaf of bread in his day cost a nickel.[2] However, prices of other objects—e.g. the cost of labor (your wage)—experience similar changes.

2. You can view inflation as a cost for holding cash.

3. Inflation reduces the cost of borrowing money. You take out a loan fixed at 5% interest, but inflation nominally increases your returns so as to effectively "cheapen" this interest rate.

   E.g. You take out a loan of USD 100,000 at 5% interest rate with a term of one year to run your restaurant. In 2019, let's say you made USD 105,000 on your restaurant. If prices have inflated 10% since then, if your production of services remained identical, you would make USD 115,500, implying that your loan is easier to pay off with higher inflation. In this respect, you can see how inflation can represent a transfer from lenders to borrowers.

4. There are ostensibly efficiency costs of inflation—typically only high "costs" in cases of hyper inflation, but present nonetheless in all forms of positive inflation. A few of these costs include:

   (a) Menu costs: in some industries it is costly to change prices quickly, and either they changes prices quickly at a cost, or charge a price that will not be updated for some time and therefore become increasing cheaper in real terms.

   (b) Shoe leather costs: inflation disincentivizes holding cash, so people may go to the bank to withdraw cash. Shoe leather costs refer to the cost of going to the bank. Maybe not so relevant anymore.

   (c) Price-allocations and efficiency: Inflation distorts prices and buyers and sellers can experience difficulty in distinguishing between inflation-induced price changes and real changes in relative valuation.

[2] It's one loaf of bread, what could it cost? 10$?

(d) Hoarding and political unrest are typical in situations of hyper inflation.

5. There are also ostensibly efficiency benefits of inflation:

   (a) Wages typically cannot be adjusted downward, so in an efficiency sense, inflation relieves downward pressure on wages that are "too high".

   (b) In the respect that inflation disincentivizes holding cash, light inflation incentivizes lending.

   (c) Inflation facilitates increases of employment (at least in the short-run, in the longer-run as well depending on consumer expectations) (not quite an "efficiency" benefit per se)

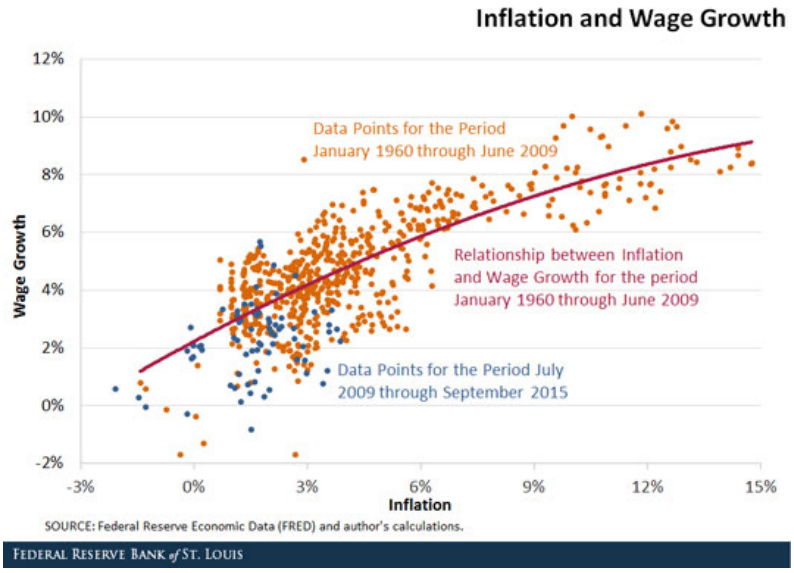
   (d) Accommodates population growth.

Wages and inflation

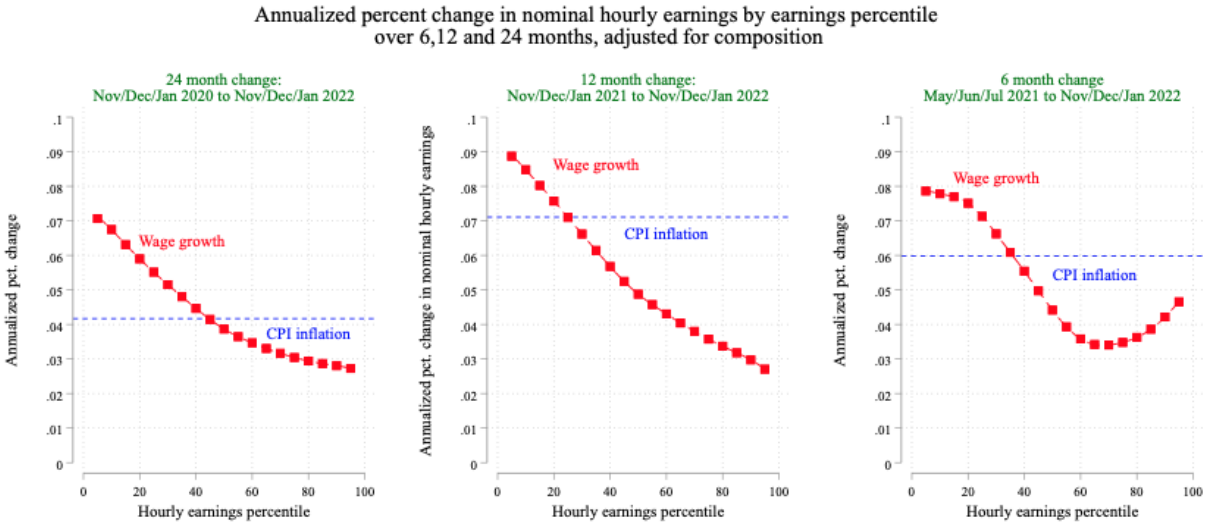
The first way we might think about the distributional effects might be with respect to wages. When economists talk about wages, they often employ the term "downward rigidity". All this means is that wage setters can typically *increase* nominal wages, but they can't/don't normally *decrease* nominal wages. This represents an efficiency friction for employers, and so often the simplest way for employers to lower *real* wages are by letting inflation undermine nominal wages.

Let's think about two things:

- Which parts of the income distribution are more heavily reliant on labor income (as opposed to capital income)? I.e. who are the people who would be most affected by downward ridigity?
- Which part of the labor income distribution is likely characterized by very low nominal wage increases?



Data collected by the US federal government indicates that nominal wages *do* tend to correlate positively with, but ultimately fall short of inflation.



Note: CPS ORG data. Not-seasonally adjusted, all workers. Hourly earnings winsorized at $5 and $100. Wage percentiles smoothed with lowess. Composition adjustment using inverse probability weighting based on age, education, race/ethnicity, gender, marital status, citizenship, country of birth, 4-part region, and detailed industry and occupation codes. CPI-U annualized. Analysis by @arindube

Recent work from Arin Dube demonstrates that, perhaps counterintuitively, during this recent period of inflation, lower wage workers have seen the largest proportional increases wages—actually in excess inflation—indicating positive *real* wage growth, as opposed to the real decreases in wages for workers beyond the ∼40th percentiles in earnings.

How do we make sense of this? Maybe lower wages are more quickly to respond than previously thought. Maybe higher earners are seeing responses through non-wage channels (e.g. bonuses). Maybe the increases in the lower parts of the distribution are picking up recent increases in the minimum wage.

Also worth mentioning: some government redistribution plans and pensions take into account cost-of-living-adjustments (COLAs), but some do not.

Price of goods

The most general sense, we tend to think of inflation as a *homogeneous* increase in prices across the board—for everyone.[3] We normally talk about price indices as reflecting a representative consumer basket, and therefore applying to all consumers, but this decision represents an important simplification of reality.

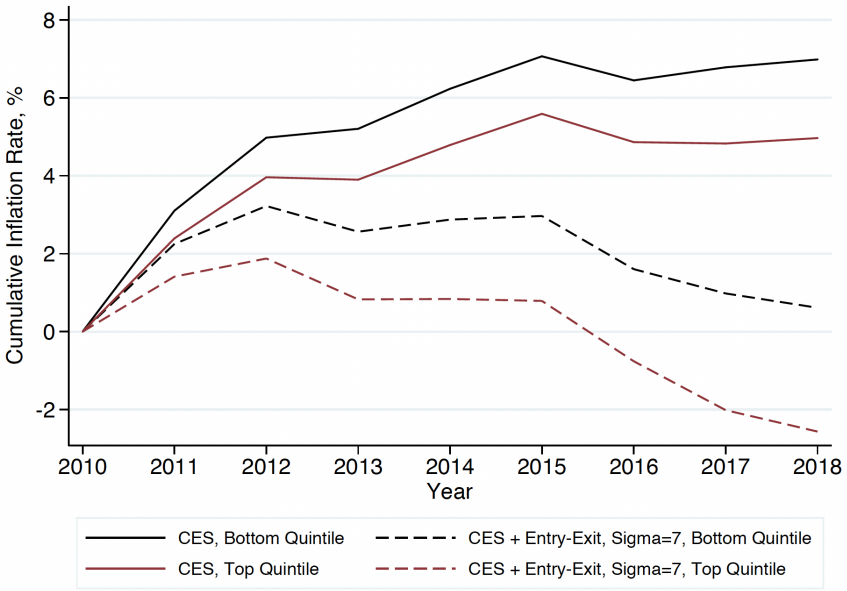
1. Consumers purchase goods and services heterogeneously by income from different parts of the distribution of costs/markups[4]

2. Different goods and services may experience differential inflation. E.g. Inflation that only affects the price of goods consumed by poor people only has a first-order effect on poor

[3]The US Federal Reserve employs a concept of *core* inflation based on the personal consumption expenditures price index (PCEPI or PCE), which uses a changing basket of household durable and non-durable expenses (and differs from the also frequently-used Consumer Price Index (CPI)). These indices aim to aggregate a representative consumer bundle, and by their nature exclude goods with volatile prices, like oil).

[4]Faber and Fally (2019, working paper) demonstrate that richer households source their consumption from the largest, more quality-intensive firms. This finding has implications for inflation based on how inflation differentially affects costs, markups, and quality.

Figure from Gunter and Jaravel (2021, working paper)



(a) U.S.A., 2010-2018

people, since rich people are immediately unaffected by the prices of goods consumed by lower-earners.

You can view disaggregations price change disaggregations by type of good/services from the Bureau of Labor Statistics Which goods and services do you think make up greater shares of incomes of lower or higher earners? What does their inflation look like? What might you conclude regarding which groups consume the goods/services most/least affected by inflation?

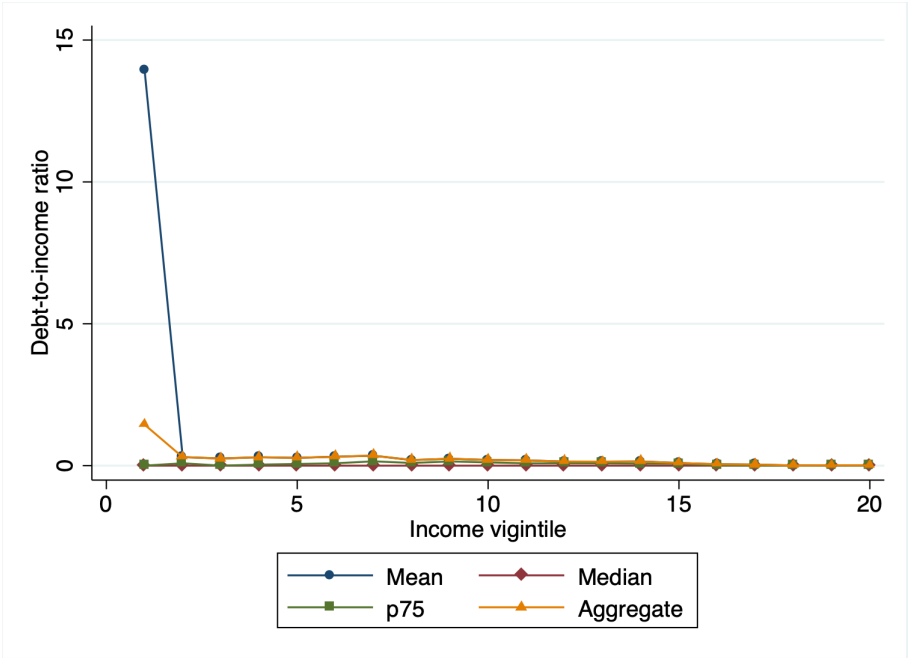
Recent work from Gunter and Jaravel study inflation along the income distribution. They use household-linked expenditure and goods data to see whose bundles are inflating at faster/slower rates. They ultimately find that, in the US, the prices of goods inflated significantly higher among the bottom quintile of earners than among the top quintile of earners. This finding remained somewhat identical across other countries, with only a few locations where richer households experienced higher inflation.

Cost of capital and debt

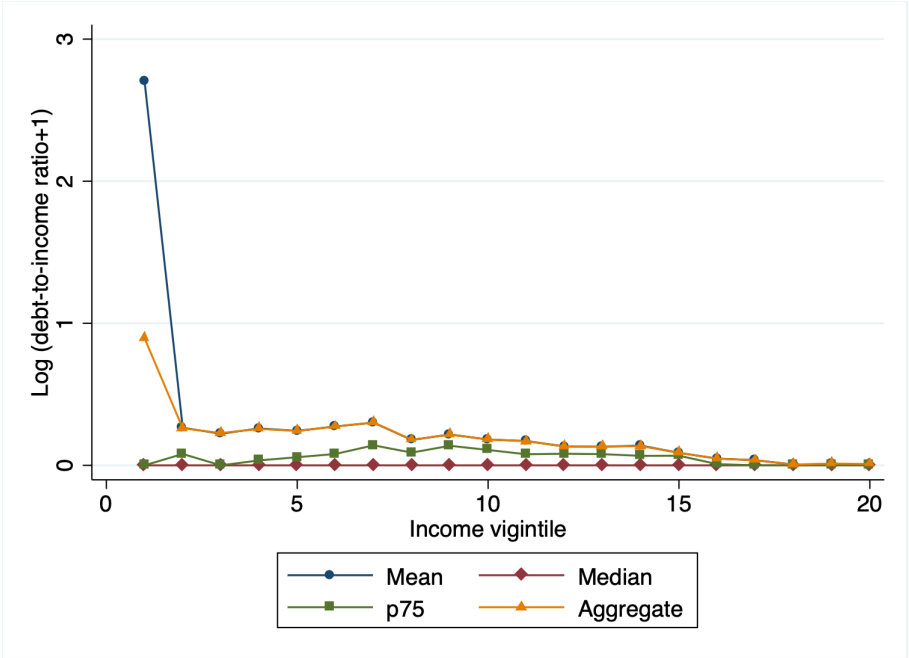
Inflation has important implications for the real interest rate—i.e. the price associated with lending money. The example at the beginning illustrates that inflation renders borrows more able to pay down debts. In this respect, inflation represents a transfer from lenders to borrowers. From here we might ask: distributionally, who are lenders and who are borrowers? We can study this question using data from the Survey of Consumer Finances. SCF data from 2019 suggests that poorer households are disproportionately indebted (as measured by the debt-to-income ratio).

However, costs of borrowing and lending go beyond direct household incidence, as businesses and corporations also engage in borrowing and lending. The distributional incidence from these

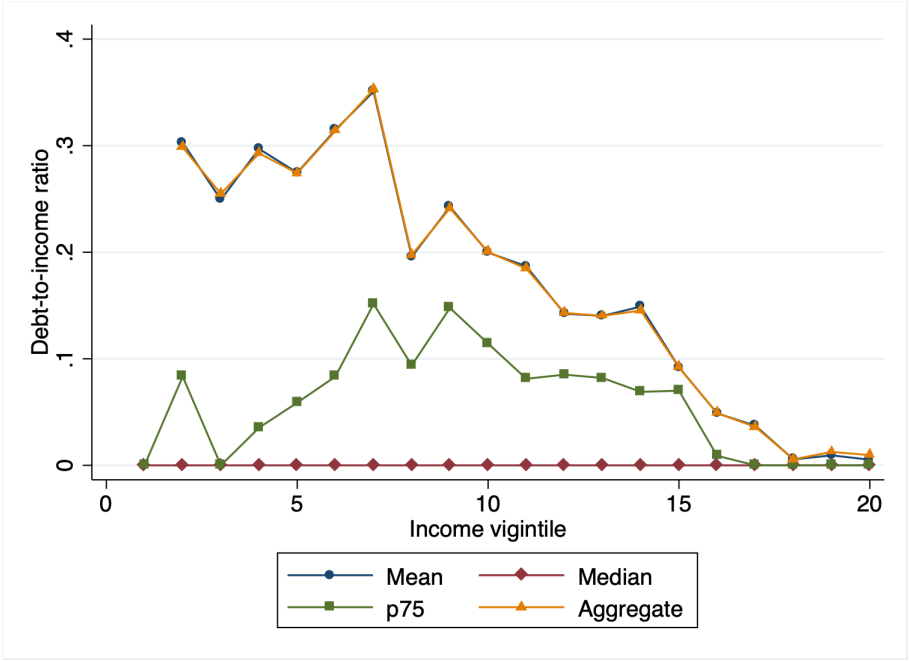
Debt-to-income ratio, by income (SCF 2019)



Log(debt-to-income ratio + 1), by income (SCF 2019)



Debt-to-income ratio (below one), by income (SCF 2019)



channels is less clear, at least immediately.

However, from the perspective of capital owners lending their money through the purchase of securities, their nominal returns usually exceed inflation, as stock prices continuously incorporate inflation. In this respect, capital income generated from ownership of securities may prove more resilient to inflation than wage labor income, and we might think this point to further the inflation regressivity argument.

Another dimension to the capital cost component of this question pertains to public debt and government deficits. Just as inflation lowers the real cost of borrowing for private borrowers because it undermines nominal + rigid interest rates, it also lowers the cost of government borrowing.

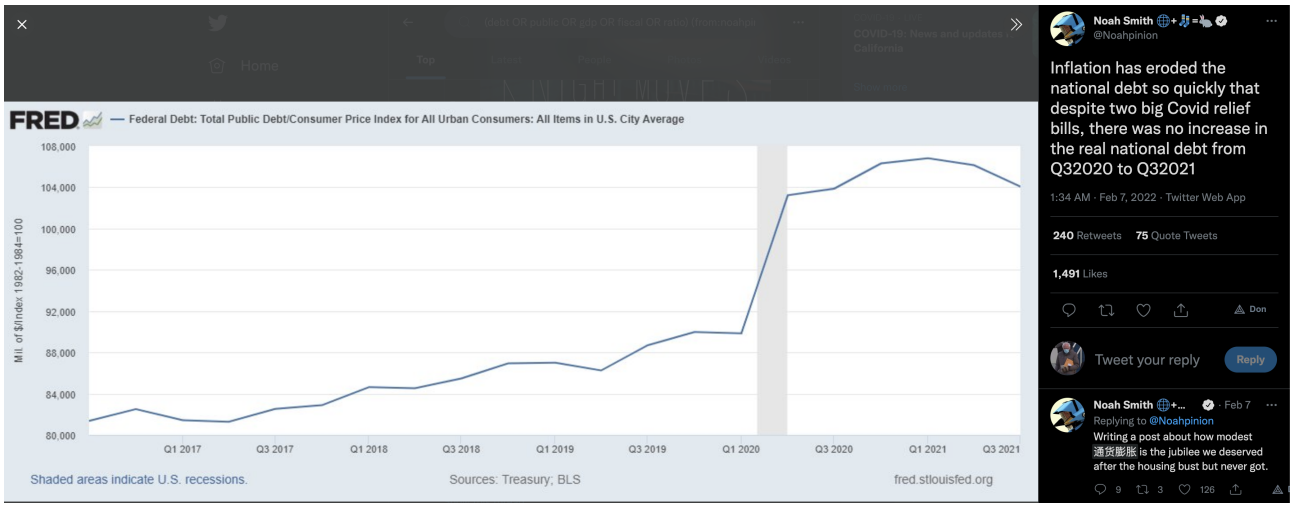
But to which group does lower government borrowing represent a transfer? This is also a potentially complicated question, and it depends on the answers to the following questions:

1. Is the government budget constraint binding? A: Yes, and we're **not** going there.
2. Are government debts financed in net by increases in tax collections or decreases in spending?

If governments pay down public debts via taxes, the benefit depends on the net progressivity of the (US) tax system: lightly progressive, arguably flat, so that decreased taxes either benefit high taxpayers, are distributionally neutral, or depend on the incidence of the specific tax whose rate would be alleviated.

If governments pay down public debts via decreases in spending, decreases in public debt are distributionally progressive insofar as government spending is generally progressive.

Real public debt, courtesy of @noahpinion



An unsatisfying conclusion

So, what *is* the net distributional impact of inflation? Some unfortunate answers include:

1. It depends
2. It's complicated
3. Maybe it's not an answer that's necessarily generalizable
4. **shrugs shoulders**

But let's recap:

1. Recent inflation has adversely affected higher earners' real wages more than those of lower earners
2. We can think about inflation as a cost on holding cash or on keeping cash in sufficiently low-return accounts—it's likely that this "cost" disproportionately impacts lower earners who are less likely to invest their savings as well as whichever group holds more cash (unsure)
3. Some government spending and pension programs include inflation adjustments
4. Lower earners' goods seem to inflate in price more quickly than do those of higher earners
5. Inflation lowers borrowing costs, which tends to benefit lower earners—who are more disproportionately indebted
6. Capital income generated from securities well-accounts for inflation because inflation is continuously capitalized into the price of securities
7. The distributional incidence of inflation through government debt alleviation is unclear

What other perspectives on inflation did we miss?

We've seen that the answer to this question really is complicated, and while we have some intuition that helps us think through the relevant forces at play, but empirical evidence sometimes suggests a reality that runs quite counterintuitively to our expectations.

Addendum: political narratives

As with for many open questions, people and institutions carry their own political baggage and biases when advocating for their own view. How do you think political biases align on this issue?

At least in the US, political biases align such that actors on the American right tend to argue that inflation is regressive. Those on the American left tend to argue that inflation is either *not* regressive, or is in fact lightly progressive. A perhaps overly simple explanation of this tendency might point out that political actors heuristically argue that 1) central banks will finance large government spending programs through seigniorage (printing money) or that 2) government activity will increase inflation through demand effects. Rhetorically, if one does *not* want higher inflation, policymakers should refrain from engaging in significant government spending. However, it is important to mention that very little actual empirical work exists corroborating the existence of a positive relationship between inflation and government spending—although this hypothesis is quite difficult to subject to rigorous empirical testing.[5]

In terms of political narratives, political actors on the American right argue for the regressivity of inflation as a means of undermining the progressivity-oriented arguments in favor of government spending. Those on the American left will make the opposite case in defense of government spending. Additionally, the American left tends to appeal to Philips-curve-flavored arguments that higher inflation induces higher employment and accommodates greater consumer demand, at least in the short-run.[6]

See discussions from The Nation and Cato Institute for examples of more overtly political discourse surrounding this topic.

This all said, the issue of the distributional incidence isn't *as* overtly partisan as other popular economic topics (for many reasons—it's relatively unsettled, econs and non-econs alike have widely diverse views that aren't necessarily in direct conflict, and it's evidently quite complicated). Nevertheless, the distributional incidence of inflation has incredibly important implications our understanding of monetary and fiscal policy.

[5] Macroeconomic models make different predictions of the inflationary tendencies of government spending depending on the nominal interest rate. Some perspectives advocate that government spending raises interest rates and crowds out borrowers, and other perspectives argue that government spending may increase demand (and possibly result in additional inflation).

[6] Figures on the American left also criticize central bank prioritization of lower inflation as reflecting a more general preference of capital markets stability over worker well-being, though this point is *arguably* less visibly grounded in economic foundations.