# Comment on “Inflation’s Fiscal Impact on American Households”

Adrien Auclert*

August 2024

What are the costs of inflation? In a classic article, Fischer and Modigliani (1978) observed that “There is no convincing account of the economic costs of inflation that justifies the typical belief — of the economist and the layman — that inflation poses a serious economic problem, relative to unemployment.” Their paper presented “a systematic account of the real effects of inflation that [the authors hoped] will contribute to understanding of and continuing research on the costs of inflation.” Almost 50 years later, a large body of research has, in fact, formalized and quantified the various costs of inflation that Fischer and Modigliani identified in their seminal paper. This paper by Altig, Auerbach, Eidschun, Kotlikoff and Ye (2024) is an important part of this continuing research effort.

The paper focuses on *one component* of the total cost of inflation, which the authors call its “fiscal impact”. The fiscal impact of inflation arises from the fact that the U.S. tax system—like all tax systems I know of—is not robust to the presence of inflation. The best-known example of fiscal impact is the “bracket creep” phenomenon. In the late 1970s and early 1980s, inflation was running over 10% a year, but the U.S. Federal income tax brackets were fixed in nominal terms. This pushed many taxpayers into higher tax brackets, meaningfully increasing marginal tax rates (eg, Saez 2003). Today, partly as a result of this episode, most of the tax system is indexed, with tax brackets revised each year. But indexation is still incomplete—it only occurs once a year—and it is also imperfect: to give an example that has been in the news lately, it doesn’t apply to brackets determining the taxation of social security benefits. Official projections from the CBO show that “real bracket creep” amounts to a meaningful source of projected tax revenue, growing to 1.5 percent of GDP by 2049 (Congressional Budget Office 2019). So, fiscal impacts can be large in the aggregate, and it is clearly relevant to study them.

A lesser-known fiscal impact is due to the fact that federal and state income taxes apply to nominal, rather than real, interest paid on assets and liabilities. When inflation is higher, nominal interest rates are higher in part to compensate investors for higher expected inflation. However, because nominal interest is taxed, the compensation for inflation is taxed as well. This affects asset holders with lots of nominal interest income the most, and on the other hand benefits liability

*Stanford University, CEPR and NBER. Email: aauclert@stanford.edu. I thank the authors for helpful discussions and Gianluca Violante for suggesting the term "sticky government institutions".

holders who make large nominal interest payments that they can deduct from their taxes. Because the distribution of assets and liabilities is very unequal, the fiscal impacts are very unequally distributed. This paper reports the distribution of household-level fiscal impacts.

The paper quantifies these household-level fiscal impacts by asking the following question: what fraction of lifetime consumption would each household in the Survey of Consumer Finances be forced to give up if inflation were to increase permanently by $\pi$%, holding everything else fixed, and assuming that the only costs of inflation are fiscal costs?

As I have argued, this question is clearly interesting and relevant, and I believe the paper is the first of its kind to provide a comprehensive quantitative answer. This discussion makes two main points, one on scope and one on method.

Regarding scope, there are clearly non-fiscal costs of inflation in addition to fiscal costs. The answer provided by this paper, however comprehensive on the fiscal costs, is therefore only a part of what we ultimately want to know, which is the *total cost*, at the household level, of increasing inflation. A related point is about general equilibrium. Imperfect indexation of the tax system means that when inflation rises, the household sector loses and the government benefits. The paper is silent on what the government does with these extra resources, but this would clearly matter in a comprehensive assessment. The first part of my discussion will try to provide the relevant context for the magnitudes found in the paper.

Regarding method, the paper does its calculations using proprietary software. This makes it quite difficult to understand where its quantitative answers are coming from. The second part of my discussion will argue that these magnitudes appear reasonable based on simple back-of-the envelope calculations, and provide an alternative route to the use of proprietary software to do these calculations.

Before diving in, let me also mention that the thought experiment that the paper is after fundamentally relies on the idea that "government institutions are sticky". Just like a simple Calvo model of price stickiness is inconsistent with evidence that the frequency of price change increases with the rate of inflation, a simple model of government institution stickiness is inconsistent with the fact that U.S. tax brackets started getting indexed after the bracket creep of the 1970s. We can still use these models to get a baseline quantitative answer, but it is important to recognize that it will likely be an upper bound, as institutions adapt to rising inflation.

## 1 The costs of inflation in context

Because the Altig et al paper focuses on a component of the cost of inflation, it is useful to go back to Fischer and Modigliani's taxonomy to understand how it fits in the literature and to provide context for its answers. The headline number from Altig et al. (2024) is that a permanent increase in the inflation rate from 0 to 10% reduces median lifetime spending by 6.82%. How does this compare to the other, consumption equivalent (CE) welfare costs of inflation that the literature has calculated?

| Cost | Relevant literature | C.E. welfare loss from $\pi$ =10% |
|---|---|---|
| Opportunity cost of holding money | Friedman rule - Lucas (2000) | 1% |
| Price dispersion | New Keynesian - Nakamura et al. (2018) | >5% (Calvo), ~0.5% (Menu costs) |
| Redistribution of nominal wealth | Fisher effect - Doepke and Schneider (2006) | 0.8% average (-14% to 66% across cohorts) |
| Nominal government institutions | Fiscal impact - Altig et al. (2024) | 6.8% average (3% to 9% across cohorts) |

Table 1: Fischer and Modigliani (1978)'s costs of inflation and their modern quantification

I will focus on three other well-known calculations of the costs of inflation that were also laid out in the Fischer and Modigliani (1978) measurement agenda: two from the aggregate costs of inflation, and one that focuses on the heterogeneity and has many parallels to those of the Altig et al. (2024) paper. Table 1 summarizes the results from my discussion below. We will see that a 6.8% number is quite large, but not unheard of, and that the heterogeneity in welfare effects that they document is actually comparable, or a little smaller, to the heterogeneity from the impact of nominal wealth redistribution.

Fischer and Modigliani (1978) proposed to understand the costs of inflation using a series of thought experiments. First, they thought, imagine that we are living in a fully indexed economy: wage and price contracts are indexed, debt instruments are indexed (except for currency, which pays no nominal interest); tax brackets and other payments fixed by law are indexed; real rather than nominal returns on assets are taxed; there are no nominal interest rate ceilings, and so on. In this economy, they reasoned, there would only one main effect from an increase in inflation: the opportunity cost of holding currency would increase.[1]

### 1.1 Cost from higher nominal interest rates

This effect has since been quantified as the welfare cost of departing from the Friedman rule, for instance, in settings where money enters the utility function or there is a cash-in-advance constraint (see, among many others, Lucas and Stokey 1983, Woodford 1990, and Chari and Kehoe 1999). The basic idea for quantifying the welfare effect goes back to Bailey (1956), and has since been revisited by Lucas (2000). Suppose, as in the Sidrauski (1967) model, that the utility function is $U\left(c, \frac{M}{P}\right)$ where $c$ is consumption and $\frac{M}{P}$ is real money balance. Suppose that we are in a steady state where $c$ is constant and $M$ and $P$ grow at the same rate $\pi$. Then, across steady states with different inflation rates $\pi$, the real interest rate is the constant $r = \rho$, the time discount rate, and the nominal interest rate is $i = \rho + \pi$. The demand for money is determined by the first order condition $\frac{U_m}{U_c} = i$.

Let $w(i)$ be the percentage increase in steady-state consumption needed to leave a household indifferent between a steady state interest rate of $i$ and one of 0. Let $m(i)$ be the steady-state

[1]They also discuss the fact that firms would incur larger menu costs from changing their prices more frequently. I will treat this effect in a moment as one that comes from price stickiness.

money demand to consumption ratio $\frac{M}{Pc}$ when the interest rate is $i$. Then, by definition, we have

$$U\left(\left(1+w\left(i\right)\right)c, m\left(i\right)c\right) = U\left(c, m\left(0\right)c\right)$$

for any $i$. It follows that, around any steady state where the interest rate is $i$, we have:

$$w'\left(i\right) = -\frac{U_m}{U_c}m'\left(i\right) \simeq -im'\left(i\right) = m \times \left(-\frac{dm/m}{di/i}\right) = m \times \eta$$

where $\eta \equiv -\frac{dm/m}{di/i}$ is the interest elasticity of money demand. This equation is helpful because it allows us to relate the welfare effect of inflation to measurable quantities $m$ and $\eta$. Since, across steady-states with different inflation rates $\pi$, we always have $i = \rho + \pi$, in particular we have $di = d\pi$. This leads to the famous Bailey (1956)–Lucas (2000) formula for the welfare cost of inflation:

$$dw = w'\left(i\right)di = m \times \eta \times d\pi \tag{1}$$

Equation (1) says that the consumption equivalent welfare loss from an increase in inflation of $d\pi$ percent is the product of the money balance-consumption ratio $m$ and the interest elasticity of money demand $\eta$, times $d\pi$. Using Lucas (2000)'s estimates of $\eta = 0.5$ and $m = 0.2$, this implies a welfare cost of reducing the annual rate of inflation from 10 percent to 0 at $0.2 \times 0.5 \times 10 = 1\%$ of real consumption. This provides us with a useful benchmark against which to compare the 6.8% average number in the Altig et al paper. We see that the fiscal impact is substantially larger than the effect from departure from the Friedman rule, at least under conventional estimates of the money demand elasticity.

### 1.2 Cost from price dispersion under nominal rigidities

Fischer and Modigliani (1978) next proposed to consider the effects of adding price stickiness to their fully indexed economy, causing "distortions of relative prices [that are fixed] at different times". The New Keynesian literature has since developed a framework that allows us to quantify these effects of price dispersion. Suppose that flow utility is $u\left(c\right) - v\left(n\right)$, and that we consider the steady-state of a standard New Keynesian model where inflation is $\pi$ and price dispersion is $\Delta$. In this framework, price dispersion acts as a productivity loss, with the production possibility frontier being $c = \frac{n}{\Delta}$. The first-order condition for consumption vs labor is $v'\left(n\right)/u'\left(c\right) = \frac{1}{\Delta}$. Moreover, the consumption-equivalent welfare loss from an inflation rate of $\pi$ is now defined by the equation

$$u\left(\left(1+w\left(\pi\right)\right)\frac{n}{\Delta}\right) - v\left(n\right) = u\left(n\right) - v\left(n\right)$$

These equations lead us to an expression for the welfare loss from inflation in terms of the sensitivity of price dispersion to inflation around a zero-inflation steady state with $w = 0$ and $\Delta = 1$:

$$dw = w'\left(\pi\right)d\pi = \Delta'\left(\pi\right)d\pi \tag{2}$$

Hence, price dispersion is also a measure of the consumption-equivalent welfare loss from inflation. Now, we can use the expression for price dispersion in the canonical New Keynesian model with constant returns to scale in production to derive:

$$\begin{aligned} w(\pi) &= \Delta(\pi) - 1 \\ &= (1-\theta)^{-\frac{1}{\epsilon-1}} \left(1-\theta(1+\pi)^{\epsilon-1}\right)^{\frac{\epsilon}{\epsilon-1}} \left(1-\theta(1+\pi)^{\epsilon}\right)^{-1} - 1 \\ &\simeq \frac{\epsilon}{2} \frac{\theta}{(1-\theta)^2} \pi^2 \end{aligned} \tag{3}$$

where $\theta$ is one minus the frequency of price change and $\epsilon$ is the elasticity of substitution between goods, and the last equation provides a quadratic approximation around $\pi = 0$.

Nakamura et al. (2018) quantify these kinds of effects using $\theta = 0.899$ (a frequency of price change of 0.101 per month) and an $\epsilon$ of 7, which is a typical value for the New Keynesian literature. Then, the percentage annual consumption loss from going from 0% to 10% inflation due to price dispersion is $w \simeq 5.5\%$, which is much larger than the quadratic approximation of $\frac{7}{2} \times 88 \times \left(\frac{0.1}{12}\right)^2 = 2\%$ because the model becomes highly nonlinear as inflation rises. Here, we actually see that the welfare cost of inflation under a Calvo model is quite comparable to Altig et al. (2024)'s estimate of the average fiscal impact.

However, this is probably an overstatement of the true cost of price dispersion. The baseline effect from from the Calvo model is generally thought to be implausibly large. As Nakamura et al. (2018) argue, it is also dramatically mitigated when price setting occurs under menu costs rather than under a Calvo model. In their calibration, the welfare loss from price dispersion under menu costs stays bounded at around 0.5%, without being much affected by the aggregate inflation rate (see their figure 2).

### 1.3 Cost from nominal redistribution

Fischer and Modigliani (1978) then proposed to add in the effects of unanticipated inflation through existing assets and liabilities fixed in nominal terms, which they pointed out, generate "redistribution from the private to the public sector and between private debtors and creditors". An important paper by Doepke and Schneider (2006) proposed a systematic quantification of these "Fisher" effects (a reference to Irving Fisher's debt-deflation theory of recessions—Fisher 1933—not to be confused with Stanley Fischer!), using micro data on household nominal asset and liability holdings. They found these effects to be very large.

Quantifying these effects is somewhat less straightforward than the two I just discussed. In part, this is because they are conceptually different, because they are transitional effects: they arise on impact of a transition from one steady-state inflation rate to another, as a result of the redenomination of the value of assets and liabilities. To first order, the formula for the real present value effect of a permanent increase in inflation by $d\pi$ for a household $h$ with a net nominal

| Age cohort | Lifetime spending/income | Losers (% of cohort) | Mean C.E. loss (%) | Mean C.E. gain (%) |
|---|---|---|---|---|
| $\leq 35$ | 19.5 | 25 | -2.1 | 13.8 |
| 36-45 | 18.7 | 29 | -4.9 | 9.7 |
| 46-55 | 17.2 | 40 | -6.1 | 4.9 |
| 56-65 | 14.8 | 58 | -11.7 | 2.4 |
| 66-75 | 10.9 | 73 | -18.2 | 2.1 |
| $> 75$ | 4.55 | 84 | -65.6 | 3.1 |

Table 2: Doepke and Schneider (2006)'s costs of inflation in consumption equivalent units

position $NNP_h$ is

$$dPV_h = -NNP_h \cdot Duration_h \cdot d\pi$$

where $Duration_h$ is the duration of the net nominal position (see Doepke and Schneider 2006 and Auclert 2019). A household with a positive net nominal position—say, holding long-term nominal government bonds—stands to lose from higher inflation in proportion of the product of his nominal position and its duration: not only does a higher price level today erode the nominal value of these bonds today, but the anticipation of higher inflation in the future raises nominal interest rates, and therefore results in a capital loss that is larger when the duration is larger. On the flipside, a household with a negative net nominal position—say, holding a fixed rate nominal mortgage—stands to gain from higher inflation.

To convert a present value effect into a steady-state consumption equivalent welfare effect $dw_h$, we need to divide $dPV_h$ by the present value of consumption of household $h$, i.e. lifetime spending $PV(c_h)$. So, we have that the consumption equivalent welfare loss from inflation for household $h$ is:

$$dw_h = \frac{NNP_h \cdot Duration_h}{PV(c_h)} d\pi \tag{4}$$

Doepke and Schneider (2006)'s Table 2 gives the headline result, reporting $\frac{NNP \cdot Duration}{y} d\pi = 7.3\%$ for the household sector as a whole when $d\pi = 5\%$ (this is what they call the "full surprise" scenario). We have to double this number to get the effect for increasing inflation by 10%, and then divide by the annuitization factor $PV(c)/y$ to obtain an expression for the average CE welfare loss in (4). In the simplest possible life-cycle model, the lifetime spending/income ratio is given by $\frac{PV(c_h)}{y_h} = \frac{(1+r)}{r} \left(1 - \left(\frac{1}{1+r}\right)^{T_h}\right)$ where $r$ is the real interest rate and $T_h$ is the number of years of life remaining; assuming an average of 40 years remaining this gives us an annuitization factor of 18. Hence, the average welfare loss from inflation for the household sector as a whole from the Fisher effect is $7.3 \times 2/18 = 0.8\%$. This seems substantially smaller than the average fiscal effect.

However, the very striking finding from Doepke and Schneider (2006) wasn't the average effect, but the heterogeneity. Table 5 report the amount of wealth redistribution for each group relative to income $y_h$, ie $\frac{NNP_h \cdot Duration_h}{y_h} d\pi$ for $d\pi = 5\%$. Converting these numbers for each cohort assuming an average lifetime of 85 years, provides us with a cohort-level estimate of the welfare loss or gain from inflation, presented in table 2.

The table shows that the heterogeneity in effects is substantial. Some, especially older hold a very substantial amount of nominal wealth, causing 75 year olds to potentially lose 65% in consumption equivalent welfare from a 10% increase in inflation. On the other side some, especially younger agents have very substantial nominal liabilities, causing 35 year olds to potentially gain 14% in consumption equivalent welfare from that same 10% increase in inflation. The heterogeneity in the fiscal cost reported by Altig et al. (2024) is of the same order of magnitude, and across cohorts it is actually less. In both cases, this is due to the fact that there is substantial heterogeneity in wealth across the population, and that these effects tend to affect households in proportion to their wealth.

There is an important conceptual difference between this calculation and those from the earlier two. While the welfare cost of departing from the Friedman rule and that of price dispersion are fundamentally general equilibrium calculations, those from Doepke and Schneider (2006) are a fundamentally partial equilibrium exercise. This is clear from the fact that net nominal positions always net out to zero in the economy as a whole: any nominal debtor has a nominal creditor in some part of the economy and vice versa; there is no net supply of nominal assets. This is clear from Doepke and Schneider (2006)'s Table 2: their 7.3% loss for the household sector, combined with a 5.2% loss from the rest of the world which also holds nominal assets in the aggregate, is counterbalanced by a 13% gain for the government. But in general equilibrium, a gain from government must accrue back to the household sector somehow. Hence, the costs are probably overestimated, but the exact way in which to rebate gains and losses will matter for the final calculation.[2]

### 1.4 Fiscal impact

Finally, Fischer and Modigliani (1978) suggested to add in the "effects of nominal government institutions: imperfect indexation of tax brackets, taxation of nominal interest income and capital gains, and so on". This is what Altig et al. (2024) call the fiscal impact and, and they quantify this piece under current tax law, using individual household data and a model of the household response to changes in their environment. In many way, their paper is therefore parallel to the Doepke and Schneider (2006) paper, but focusing on the fiscal impact rather than the Fisher effect. Just like Doepke and Schneider (2006), they find large and heterogeneous effects, which is unexpected and will likely shift priors. I report the headline number of 6.8% loss, together with the minimum and the maximum across cohorts from their Figure 7b in my table 1 tom complete the comparison to the literature.

Just like Doepke and Schneider (2006), the calculation done in Altig et al. (2024) is a partial equilibrium one in nature. The losses to the household sector are gains to government, which by the logic of the intertemporal budget constraint will eventually rebate those gains back to household and mitigate the losses. Here again, the exact nature and timing of rebates would matter for the final calculation, which is why it is outside of the scope of this paper to do it. However, it is important to bear this in mind when thinking about the overall magnitude.

[2] I explore this issue in some more detail in Auclert (2019), section IID.

### 1.5 Combining the effects

Obviously, in the real world the effects that Fischer and Modigliani (1978) discussed are all present to some extent. I have provided context for each effect in isolation, but it is noteworthy that the formulas presented in (1), (2) and (4)—as well as formula (7) I will derive for the fiscal impact in the next section—are all linear. Therefore, a reasonable estimate of the total costs, including at the household level, is just to add them all up. Obviously, each particular model is nonlinear (as we saw with $\Delta$ in the Calvo model), and Altig et al. (2024) themselves find some evidence of nonlinearity: their estimates from 10% inflation are a little less than double the effects at 5% inflation, ie they find some modest concavity in size (while the Calvo model is highly convex in size.) To truly assess the magnitude of these nonlinearities as well as the potential interactions between the different effects of inflation, one would need a model in which all the effects are present at once. This would be an interesting avenue for future research.

## 2 The fiscal effects of inflation: a simple calculation

Having provided context for the magnitudes found by Altig et al. (2024), I now would like to move on to the core of their calculation of the fiscal impact. The paper does an impressive amount of work, but it is difficult to follow the details of the calculation because the quantitative answers are all obtained from a proprietary software (MaxiFi) that is fed information from the Survey of Consumer Finances. Moreover, there are scant details about how the algorithm itself actually works, thouh we may be conforted by the fact that "the program runs in finite time". Obviously, this is not ideal for transparency.

In this section, I will proceed along similar lines as for the other three effects I discussed, by deriving a formula for the consumption equivalent welfare costs from first principles and then seeing whether the magnitudes obtained by the authors seem reasonable in that light. I will find that they do. Hopefully this also provides a useful set of intuitions for what may be going on inside the MaxiFi software.

Just as in Altig et al. (2024)'s calculation, my objective is to provide a partial equilibrium estimate of the consumption-equivalent welfare gain or loss from the fiscal impact.

The model I will solve is a simplified model of that used in Auclert et al. (2021), augmented with a nominal tax system that is imperfectly indexed to inflation. Households in the model solve the following maximization problem:

$$\max \sum_{j=0}^{T} \beta^j \Phi_j u\left(c_{jt}\right) \tag{5}$$

where $j$ represents age, $\beta$ is the discount factor, $u$ is instantaneous utility, and $\Phi_j$ is the probability of surviging until age $j$.

Income taxation is progressive; for simplicity I assume a two-bracket system with $B_t$ giving the threshold at which the marginal tax rate jumps from $\tau_1$ to $\tau_2 > \tau_1$. Hence, the retention function from pre-tax income $W_t y_j$ (the product of current wage per efficiency unit of $W_t$ and age-specific efficient labor supply $e_j$) is

$$\mathcal{R}_t\left(W_t y_j\right) = \begin{cases} \left(1-\tau_1\right) W_t y_j & W_t y_t \leq B_t \\ \left(1-\tau_1\right) B_t + \left(1-\tau_2\right)\left(W_t y_j - B_t\right) & W_t y_t \geq B_t \end{cases}$$

Agents invest in nominal assets. The nominal budget constraint reads

$$P_t c_{jt} + \phi_j A_{jt} = \left(1 + i_t\left(1-\tau_a\right)\right) A_{j-1,t-1} + \mathcal{R}_t\left(W_t e_j\right) + T_t$$

where $\tau_a$ is the tax rate on asset income, and $T_t$ represents government-provided benefits, which we assume to be lump-sum.

There are two "sticky government institution" frictions. First, the adjustment of tax brackets and benefits is lagged by one period, so we have that $B_t = bP_{t-1}$ and $T_t = tP_{t-1}$ for some constant $b$ and $t$. And second, it is nominal, rather than real, interest that is taxed. To see how much these matter for real income at different levels of inflation $\pi$, we rewrite these constraints in real terms. Using $a_j \equiv \frac{A_{jt}}{P_t}$, and focusing on someone who makes more than $B_t$ for simplicity, the real budget constraint is

$$c_j + a_j = \frac{\left(1 + i\left(1-\tau_a\right)\right)}{1+\pi} a_{j-1} + \left(1-\tau_2\right) w e_j + \frac{\left(\tau_2 - \tau_1\right) b + t}{1+\pi}$$

where the term in $\tau_2 - \tau_1$ on the right disappears if income falls inside the first bracket. Now, enforcing the Fisher equation $\frac{1+i}{1+\pi} = 1 + r$, we have the following budget constraint

$$c_j + a_j = \left(1 + r\left(1-\tau_a\right)\right) a_{j-1} + \left(1-\tau_2\right) w e_j \underbrace{-\tau_a \frac{\pi}{1+\pi} a_{j-1}}_{\text{taxation of nominal interest}} + \underbrace{\frac{\left(\tau_2 - \tau_1\right) b + t}{1+\pi}}_{\text{imperfect indexation of benefits}} \tag{6}$$

Equation (6) shows clearly the two fiscal effects from higher inflation in this model. First, due to imperfect indexation, inflation erodes the real value of tax brackets and transfers, and effect that affects households with higher transfers and those in higher tax brackets the most. And second, due to taxation of nominal interest, inflation creates a real income loss for households with asset holdings, which is larger the more asset holdings one has, and is negative if one has liabilities whose interest payments are tax-deductible.

A household optimizes (5) subject to (6), and this is in essence what the MaxiFi planner does, though it has the particularity of assuming an elasticity of intertemporal substitution in consumption of 0. Altig et al. (2024) proceed by simulating trajectories for each household under different assumptions about $\pi$ and reporting the effect on the present value of consumption. Here, I follow a simpler route: I note that, taking the present value on both sides of (6), we have

$$PV\left(c_j\right) = \left(1-\tau_2\right) PV\left(w e_j\right) - \tau_a \frac{\pi}{1+\pi} PV\left(a_{j-1}\right) + \frac{\left(\tau_2 - \tau_1\right) PV(b) + PV(t)}{1+\pi}$$

Now, the first order effect on $PV(c_j)$ from increasing $\pi$ starting from $\pi = 0$, which is the consumption-equivalent welfare effect, is

$$dw_j = \frac{dPV\left(c_j\right)}{PV\left(c_j\right)} = -\left(\tau_a \frac{PV\left(a_j\right)}{PV\left(c_j\right)} + \left(\tau_2 - \tau_1\right) \frac{PV\left(b_j\right)}{PV(c_j)} + \frac{PV(t_j)}{PV(c_j)}\right) d\pi \tag{7}$$

where again, the second term only applies to households who have a marginal tax rate of $\tau_2$.

Equation (7) is useful because it gives another linear expression for the consumption-equivalent welfare costs of inflation—this time for the fiscal impact. It also shows the determinants of both the overall level as well as the heterogeneity: we need to know the terms $\frac{PV(a_j)}{PV(c_j)}$, $\frac{PV(b_j)}{PV(c_j)}$ (for all the brackets below the applicable marginal tax rate), and $\frac{PV(t_j)}{PV(c_j)}$. The first will be larger for middle-aged households who have high assets relative to remaining consumption, the second for high marginal tax rate households, and the third for households with large benefits.

To quantify, a simulation of a simple version of the Auclert et al. (2021) model shows that $\frac{PV\left(a_j\right)}{PV\left(c_j\right)}$ starts around 5 at age 20, peaks around 8 at age 50 and then slowly declines towards 0, averaging around 4. Moreover, we have that $\frac{PV\left(b_j\right)}{PV\left(c_j\right)}$ is likely around 0.5 for rich households and 0 for poor households, and $\frac{PV\left(t_j\right)}{PV\left(c_j\right)}$ is likely around 0.5 for poor households and 0 for rich households. Putting this together with $\tau_a = 20\%$ and $\tau_2 - \tau_1 = 20\%$ , we find that an average household has a CE welfare loss from $d\pi = 10\%$ of $0.2 \times 4 + 0.2 \times 0.25 + 0.25 = 0.8 \times 10\% = 8\%$, which is quite close to the headline number. Moreover, the number rises to $0.2 \times 8 + 0.2 \times 0.25 + 0.25 = 1.6 \times 10\% = 16\%$ for 50 year olds, in line with their higher $\frac{PV\left(a_j\right)}{PV\left(c_j\right)}$, and is smaller for younger and older households, consistent with Figure 7 in the paper. The general patterns of heterogeneity by income are also broadly consistent with this back-of-the envelope calculation.

# 3 Conclusion

Just like Doepke and Schneider (2006) shifted my priors on the empirical magnitude of the Fisher effect of inflation, this paper by Altig et al. (2024) shifts my prior on the likely magnitude of the fiscal impact of inflation. In both papers, the large consumption-equivalent welfare losses from some segments of the population are to take with a grain of salt given the pure partial equilibrium nature of the exercise; however, the heterogeneity is large and fascinating, and would likely survive a general equilibrium calculation. Moreover, the calculations are subject to the caveat that government institutions are likely not to be that sticky in practice, as evidenced by the indexing of tax brackets that followed the bracket creep episode of the 1970s. Nevertheless, these costs are likely substantial and heterogeneous in practice, and I hope that the paper reignites interest in this relatively unexplored intersection of macroeconomics and public finance.

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