

Comment on “Sources of U.S. Wealth Inequality: Past, Present, and Future”*

Benjamin Moll
London School of Economics

June 20, 2020

1 Overview

Hubmer, Krusell and Smith provide the best quantitative assessment to date of a number of plausible drivers of the rise in wealth inequality in the United States. To this end, they synthesize thirty years of macroeconomic research on wealth distribution into a benchmark heterogeneous-agent model with many “frontier ingredients.” The paper’s main finding is that this benchmark model is surprisingly successful in accounting for many U.S. wealth inequality trends. The key model ingredient for achieving this remarkable feat is a rich stochastic process for idiosyncratic asset returns, empirically disciplined by estimates from a number of recent studies. My overall evaluation of Hubmer, Krusell and Smith’s paper is very positive, and partly for this reason I will take the opportunity here to comment on what I see as important avenues for future work on wealth inequality dynamics. All of these relate in some way to a point that Hubmer, Krusell and Smith make repeatedly and which I very much agree with, namely “just how important portfolios and asset prices are for inequality” and that “next, we need to understand households’ portfolio choices better!”

My comment has two parts. First, I will discuss the need for theories of wealth distribution with endogenous asset returns and how these may affect the authors’ conclusions on the drivers of U.S. wealth inequality. Second, I will discuss the role of asset prices in driving wealth inequality and, in particular, the question “If a large fraction of the increase in wealth inequality is due to changing asset prices, should we care?”

*I thank Adrien Auclert for useful comments and Moritz Kuhn for sharing the data used in Figure 1.

2 Needed: Theories of Asset Returns

Hubmer, Krusell and Smith find that idiosyncratic asset returns are key to accounting for the evolution of U.S. wealth inequality.¹ But return premia in their model are exogenous in both the time series and cross section. This suggests that future work should develop theories of wealth distribution in which these asset returns are endogenously determined in equilibrium.

Endogenous return premia also raises the possibility that some of the authors' conclusions about the main drivers of U.S. wealth inequality may change. For example, they find that the falling labor share falls short of accounting for the data. But because asset returns are exogenous this finding does not take into account that there may be a link from the labor share to asset returns. This is precisely the possibility considered in [Moll, Rachel and Restrepo \(2020\)](#) who argue that the flip side of a declining labor share, e.g. due to automation, are increasing returns and return premia for owners of capital. The point is more general though: one can envision many drivers of secular changes in advanced economies as also affecting return premia and, given Hubmer, Krusell and Smith's findings, all of these are therefore candidate drivers of wealth inequality.

Theories of wealth distribution with endogenous asset returns are therefore a very promising avenue for future research. Of course, a number of such theories already exist, for example theories with entrepreneurship (e.g. [Quadrini, 2000](#); [Cagetti and Nardi, 2006](#)). But future work should link returns more closely to their deep underlying drivers (technology, market structure, etc) as well as bringing to the table more of the recently available high-quality empirical evidence on such returns.

3 Asset Prices, Wealth Inequality and Welfare Inequality

I now pick up on Hubmer, Krusell and Smith's observation "just how important portfolios and asset prices are for wealth inequality", briefly discuss some other work that reaches the same conclusion, and flesh out some of this finding's implications. My main point is that asset price changes are not merely pesky "valuation effects" to be treated as residuals but that they are empirically important for understanding wealth inequality dynamics and also raise some interesting conceptual issues regarding the welfare consequences of rising wealth

¹On this point see also the excellent survey by [Benhabib and Bisin \(2018\)](#) and the references cited therein.

inequality.

3.1 Empirical Importance of Asset Price Changes for Wealth Accumulation and Distribution

The authors' theoretical finding about the importance of portfolio choice and asset prices for wealth accumulation and distribution is very much consistent with an emerging empirical literature on these topics (e.g. Feiveson and Sabelhaus, 2019; Kuhn, Schularick and Steins, 2019; Martínez-Toledano, 2019; Fagereng et al., 2019). Figure 1 uses data from Kuhn, Schularick and Steins (2019) to demonstrate the importance of asset price changes for the evolution of wealth inequality in the United States. The solid black line plots the evolution

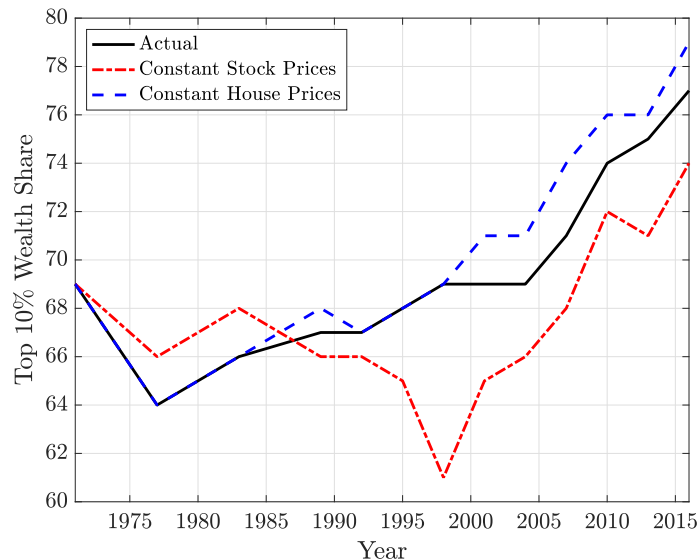


Figure 1: Asset price changes account for large share of U.S. wealth inequality changes

Notes: Source: Kuhn, Schularick and Steins (2019). See their paper for an exposition of the accounting procedure used to calculate the counterfactuals with constant stock prices and constant house prices.

of the top 10% wealth share from 1971 to 2016. The dashed red line plots a counterfactual version of the same series under the assumption that stock prices were constant at their 1971 level. Similarly, the dashed blue line plots the series with constant house prices.² The figure shows that asset price changes play a large role in accounting for the evolution of the top 10% wealth share. For instance, in the absence of stock price changes, the top 10% wealth share would have been 3 percentage points lower in 2016 (71% rather than the observed level of 74%) and an entire 8 percentage points lower in 1998 (61% rather than 69%). That is,

²See Kuhn, Schularick and Steins (2019) for a description of the data and the counterfactual exercise.

increasing stock prices have tended to increase wealth inequality as measured by the top 10% wealth share. In contrast, increasing house prices have tended to *decrease* wealth inequality as measured by the top 10% wealth share. This is because the top 10% hold relatively less housing and relatively more equity than the bottom 90%. [Kuhn, Schularick and Steins \(2019\)](#) term these differential effects the “race between housing and stock markets in shaping the wealth distribution.” Motivated by such empirical findings, an emerging theoretical literature constructs models of wealth distribution with endogenous asset prices. Examples include [Gomez \(2018\)](#), [Gomez and Gouin-Bonenfant \(2020\)](#), [Garleanu and Panageas \(2017\)](#), and [Cioffi \(2020\)](#).

3.2 Do asset price changes that increase wealth inequality also increase welfare inequality?

If a large fraction of the increase in wealth inequality is due to asset price changes, should we care? Do those whose wealth increases due to rising asset prices also benefit in welfare terms? Or are such capital gains just “paper gains”? In a nutshell, do asset price changes that increase wealth inequality also increase *welfare* inequality?

In the remainder of my discussion I will consider this question through the lens of standard economic theory. The question about the welfare effects of asset-price driven wealth inequality is closely related to a somewhat simpler question: how does an asset price change affect an asset owner’s welfare? In what follows I will think through both of these questions using a simple two-period model. To be clear, both questions are distinct from Hubmer, Krusell and Smith’s positive question “why has wealth inequality increased?” and their important progress toward answering it.

My analysis is heavily inspired by existing work, in particular [Auclert \(2019\)](#). It also draws on work analyzing the consumption and welfare-effects of house price changes ([Glaeser, 2000](#); [Sinai and Souleles, 2005](#); [Berger et al., 2018](#); [Campbell and Cocco, 2007](#)), an older literature on capital gains taxation ([Paish, 1940](#); [Whalley, 1979](#)), and even a blog post ([Cochrane, 2020](#)). Some of the results I will derive are “folk knowledge” or exist in dispersed form but I nevertheless thought it useful to derive them explicitly here using simple theory and to present them in a unified fashion.

The discussion is organized around three exercises in this simple two-period model. The first exercise considers the welfare effects of simple exogenous asset price increases. The second exercise endogenizes asset prices and examines different sources of these increases. The third exercise considers house price changes.

Exercise 1: Exogenous asset price changes

An asset owner has utility over consumption in two time periods, $u(c) + \beta u(c')$, where a prime superscript denotes a variable in the second period. Period utility u is strictly increasing and concave. She receives exogenous income flows y and y' in the two periods. She can transfer income across periods by saving in an asset that trades at price p and pays dividend D . This asset is the only saving vehicle. She has an initial asset endowment k and decides how many assets k' to carry into the second period. Summarizing, the individual's problem is

$$\begin{aligned} V(y, y', D, p) &= \max_{c, c', k'} u(c) + \beta u(c') \quad \text{s.t.} \\ c + pk' &= y + pk, \\ c' &= y' + Dk', \end{aligned} \tag{1}$$

where V denotes her welfare as a function of model parameters. The individual's initial wealth is pk so that an increase in the asset price p makes her wealthier. But does it also make her better off? The answer is simple and follows straight from the envelope condition

$$\frac{\partial V}{\partial p} = -\lambda(k' - k) \quad \text{where} \quad \lambda = u'(c). \tag{2}$$

Importantly, what matters for the welfare effect of an asset price change is not the level of asset holdings k but the planned change in asset holdings $\Delta k = k' - k$, what is sometimes called “net” or “active saving”. Intuitively, a rising asset price is good news if you are planning to sell, $\Delta k < 0$, and bad news if you are planning to buy, $\Delta k > 0$. As usual for an application of the envelope theorem, these statements are correct to first order and ignore second-order welfare effects due to the asset owner reoptimizing her asset holdings k' , a point I return to below. A particularly interesting case is an individual who, without the asset price change, was content to just consume her income each period and whose net saving was thus zero $c = y, c' = y' + Dk$ and $\Delta k = 0$. For such an individual, a small asset price increase $dp > 0$ does not change welfare at all and is indeed just a “paper gain.”³

The situation is depicted in Figure 2. Panel (a) plots the individual's welfare V as a function of the asset price p and panels (b) and (c) do the same for net saving Δk and consumption in the first period c . Consider first the solid blue lines. They depict an individual whose planned net saving at a baseline price p_0 (the dashed vertical line) is exactly zero –

³A complementary intuition starts from the question: how can an increase in wealth pk be ambiguous for the individual's welfare? The answer is that asset price changes have another offsetting effect: at the same time as her wealth pk increases the asset return D/p decreases.

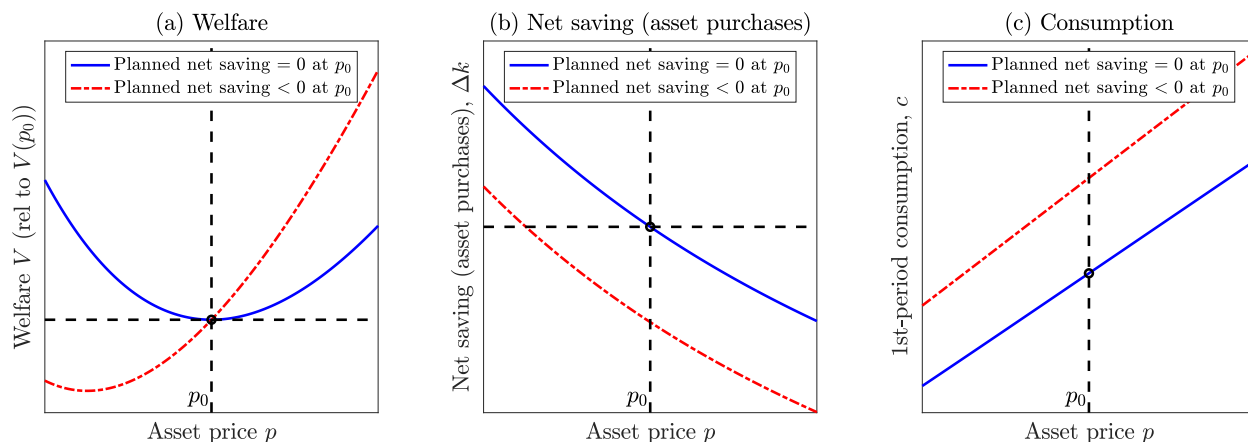


Figure 2: Effect of asset price change on welfare, net saving and consumption

see panel (b). Panel (a) shows that welfare is a U-shaped function of the asset price and that the welfare effect of a small asset price increase $dp > 0$ is zero, exactly as expected from (2). It is worth noting that the welfare effect is zero despite the fact that her consumption increases in response to the rising asset price, in line with most empirical evidence on marginal propensity to consume out of asset price changes. That is, it would be erroneous to conclude from the fact that the asset owner consumes out of her capital gains that her welfare must increase. This is because the welfare effects of such consumption changes are second order.⁴ This also explains the U-shape of welfare: the second-order effects from reoptimization are always positive regardless of whether the price increases or decreases. Intuitively, because the individual always has the option to simply keep consuming her income flow, the option to reoptimize means she has to be at least as well off as without the price change. Next consider the dashed red lines which depict an asset owner who was planning on selling, $\Delta k < 0$. When the asset price increases, she is better off, again as expected from (2).

Exercise 2: Different sources of asset price changes

The previous exercise with an exogenous asset price raises the question: where do such asset price changes come from? I now endogenize this price in a simple fashion. In particular I

⁴Why does rising consumption after an asset-price increase not translate into first-order welfare gains? The intuition can be seen from writing out (2) without using the envelope theorem to drop terms:

$$\frac{\partial V}{\partial p} = \underbrace{\left(u'(c) - \beta \frac{D}{p} u'(c') \right)}_{=0} \frac{\partial c}{\partial p} - u'(c)(k' - k).$$

So there is indeed a term $u'(c)\partial c/\partial p$ that captures the intuition that a rising asset price increases consumption and hence welfare. But this term is offset by a decrease in consumption and marginal utility in the future.

introduce another asset, namely a bond b with an interest rate R set by monetary policy.⁵ Using the same notation as in (1), the individual's problem becomes

$$\begin{aligned} V(y, y', R, D, p) &= \max_{c, c', b', k'} u(c) + \beta u(c') \quad \text{s.t.} \\ c + pk' + b' &= y + pk, \\ c' &= y' + Dk' + Rb'. \end{aligned} \quad (3)$$

There is now a portfolio choice between bonds b' with return R and assets k' with return D/p . In equilibrium, the price p adjusts so that the two returns are equalized

$$p = \frac{D}{R}, \quad (4)$$

i.e. the asset price is the present discounted value of dividends. There are thus two sources of rising asset prices: rising dividends D and a declining discount rate R .

Returning to my main question about the welfare effects of asset price changes, I now additionally ask: do these depend on the source? To answer this question, I fully differentiate (3) while taking into account the dependence of the asset price p on dividends D and the discount rate R . After a bit of algebra⁶

$$\frac{dV}{\lambda} = k \frac{dD}{R} + (b' + pk' - pk) \frac{dR}{R} \quad \text{where} \quad \lambda = u'(c). \quad (5)$$

This is the key expression in my discussion. It summarizes in one compact equation the answer to the question “What are the welfare effects of an asset-price increase and how do they depend on its source?” To understand it consider two polar cases: in one extreme, an asset price could be entirely driven by rising dividends $dD > 0$ and $dR = 0$; in the other extreme, it could be entirely driven by a declining discount rate $dR < 0$ and $dD = 0$.

In the first case of rising dividends $dD > 0$ only, we have $dV/\lambda = kdD/R > 0$. That is, if the source of rising asset prices is higher dividends, then welfare unambiguously increases. The intuition is straightforward: the increase in dividends expands the individual's budget set which has an unambiguously positive effect.

⁵The analysis is thus not one of full general equilibrium. Some readers may prefer to reserve the term “endogenous” for such analyses. The point that the source of asset price changes matters would be the same.

⁶We have

$$dV = \frac{\partial V}{\partial p} \left(\frac{\partial p}{\partial D} dD + \frac{\partial p}{\partial R} dR \right) + \frac{\partial V}{\partial D} dD + \frac{\partial V}{\partial R} dR$$

As before the partial derivatives of V follow from the envelope theorem. Additionally from (4) $\partial p/\partial D = 1/R$ and $\partial p/\partial R = -D/R^2 = -p/R$.

The second case of declining discount rates is more subtle. When $dR < 0$ we have

$$\frac{dV}{\lambda} = (b' + pk' - pk) \frac{dR}{R} \quad (6)$$

which could be either positive or negative. The logic is the same as in (2): what matters is net saving $b' + pk' - pk$, i.e. the *change* in the individual’s asset position not the level. (As an aside, Auclert (2019) refers to this term as “unhedged interest rate exposure” precisely because it determines the individual’s response to interest rate changes.) An immediate corollary is that if the asset owner just consumes her income stream so that $b' + pk' - pk = 0$ then an asset-price increase due to declining interest rates does not affect her welfare $dV = 0$. An example by Cochrane (2020) provides the intuition and is worth citing in full: *“Suppose Bob owns a company, giving him \$100,000 a year income. Bob also spends \$100,000 a year. The discount rate is 10%, so his company is worth \$1,000,000. The interest rate goes down to 1%, and the stock market booms. Bob’s company is now worth \$10,000,000. Hooray for Bob! But wait a minute. Bob still gets \$100,000 a year income, and he still spends \$100,000 a year. Absolutely nothing has changed for Bob! The value of his company is ‘paper wealth.’”*

However, we can also see from (6) that, even when a falling discount rate is the only source of rising asset prices, this may affect welfare. In Cochrane’s example, if Bob dissaves, say by selling some of his shares from time to time, then he will benefit in welfare terms from a stock market boom. In the notation of (6), when $b' + pk' - pk < 0$, $dR < 0$ implies $dV > 0$.

Returning to the key expression (5), the answer to the question “what are the welfare effects of an asset-price increase?” can thus be summarized as follows. First, the source of capital gains matters: when dividends increase, the resulting asset price increase unambiguously benefits the asset owner; in contrast, when the discount rate decreases, the resulting asset price increase has ambiguous welfare effects. Second, individuals’ “investment plans” matter: if the asset owner just consumes her dividend stream then an asset-price increase stemming from a declining discount rate has no effect on her welfare; in contrast, if the asset owner tends to dissave, also a declining discount rate increases her welfare. Which of these cases is most relevant? This is, of course, an empirical question and I very much hope that future work will aim to answer it.

The argument that the source of capital gains matters is also related to a debate in the public finance literature whether capital gains should be taxed on realization (as is common in practice) or on accrual (as under a Haig-Simons income concept). See Paish (1940) and, in particular, Whalley (1979) who provides a beautifully clear graphical analysis of a two-period

model similar to the one above.

Housing

Housing differs from financial assets such as stocks in two dimensions. First, housing is not only an asset but also a consumption good. Second, housing is indivisible and subject to substantial adjustment costs. Economists often emphasize the consumption aspect of housing, and intuition suggests that this aspect may, by itself, change how to think about asset price changes. As Glaeser (2000) puts it: *“A house is both an asset and a necessary outlay. [...] When my house rises in value, that may make me feel wealthier, but since I still need to consume housing there in the future, there is no sense in which I am actually any richer. And because house prices are themselves a major component of the cost of living, one cannot think of changes in housing costs in the same way as changes in the value of a stock market portfolio.”*

I here revisit the welfare effects of house price changes through the lens of an extension of the simple two-period model above. My main argument is that, as far as the welfare question is concerned, there is to *first order* no conceptual difference between housing and other assets. The model is identical to (3) with one difference: I replace the asset k by housing h which generates a utility flow and depreciates at rate δ . The asset owner’s problem becomes

$$\begin{aligned} V(y, y', R, p) &= \max_{c, c', h', b'} u(c, h) + \beta u(c', h') \quad \text{s.t.} \\ c + ph' + b' &= y + ph, \\ c' &= y' + Rb' - \delta h'. \end{aligned}$$

In this formulation without indivisibilities or transaction costs, the only difference between housing and a financial asset is that housing pays a “utility dividend” $\tilde{D}(c', h') := u_h(c', h')/u_c(c', h') - \delta$ rather than a financial dividend D . I now briefly repeat the two exercises I conducted in the model with a financial asset. First, analogously to (2), the effect of an exogenous house price change is $\partial V/\partial p = -\lambda(h' - h)$ with $\lambda = u_c(c, h)$. As before, a rising house price is good news if you were planning to sell, $\Delta h < 0$, bad news if you were planning to buy, $\Delta h > 0$, and it leaves welfare unchanged if you were planning to do neither. Similarly, the source of house price changes matters for their welfare effects. Analogously to (4), in equilibrium the house price adjusts so that the returns on housing and bonds are equalized and hence $p = \tilde{D}(c', h')/R$. The house price can thus again rise for two reasons: first, because interest rates fall and, second, because individuals’ preferences for housing in-

crease. To understand the two effects, we consider a small interest rate perturbation $dR < 0$ as well as a small perturbation to the “utility dividend” $d\tilde{D}(c', h') > 0$.⁷ Analogously to (5)

$$\frac{dV}{\lambda} = h \frac{d\tilde{D}}{R} + (b' + ph' - ph) \frac{dR}{R} \quad \text{where} \quad \lambda = u_c(c, h)$$

To first order, the welfare analysis is thus exactly analogous to the earlier one. First, the source of the house price change matters and a house price increase driven by a declining interest rate has ambiguous effects. Second, “investment plans” matter: if the house’s owner is not planning on moving then a house price increase stemming from a declining interest rate has no effect on her welfare; in contrast, if she is planning on selling, also a declining interest rate increases her welfare. It is worth briefly relating this analysis back to the passage from Glaeser (2000) cited above: as far as welfare is concerned and to first order, one actually *can* think of changes in housing costs in the same way as changes in the value of a stock market portfolio. However, this does not invalidate Glaeser’s statement – or rather it only “invalidates it to first order” – because the second-order welfare effects of asset price changes will generally differ for housing and financial assets. Housing also has other features besides the consumption aspect, for instance that it is indivisible and entails substantial transaction costs, that further complicate a full welfare analysis of house price changes.

Main Takeaways: asset prices, wealth inequality and welfare inequality

Let me return to my motivating question: do asset price changes that increase wealth inequality also increase welfare inequality? Through the lens of standard economic theory the answer is a resounding “it depends.” The first lesson is that the source of capital gains matters: to take a concrete example, if the booming stock prices that have increased observed wealth inequality in Figure 1 are primarily due to rising dividends, then higher wealth inequality likely also translated into higher welfare inequality; in contrast, if they are primarily due to falling discount rates, then things are more complicated. The second lesson, that applies precisely in this more complicated case, is: “investment plans” matter. Whether investors benefits from an asset price boom depends not on the amount of assets they own but whether they intend to buy, sell or keep their portfolios unchanged (as in Cochrane’s example). Finally, I showed that, the situation is (to first order) the same if a prime reason for rising wealth inequality is rising house prices.

⁷The perturbation to the “utility dividend” $d\tilde{D}(c', h')$ should be thought of as a perturbation to a preference parameter. For example, with separable utility $u(c, h) = U(c) + \theta V(h)$, this utility dividend is $\tilde{D}(c', h') = \theta V'(h')/U'(c') - \delta$ and a small change $d\theta$ leads to a small change $d\tilde{D}(c', h') = V'(h')/U'(c')d\theta$.

4 Conclusion

Hubmer, Krusell and Smith have produced the state-of-the-art quantitative evaluation of the drivers of U.S. wealth inequality and should be applauded. The main takeaway from their work and from my comments above is that the wealth inequality literature needs better theories of idiosyncratic asset returns and and to take more seriously asset price changes as a driver of wealth inequality, both of which are important features of the data.

References

- AUCLERT, A. (2019): “Monetary Policy and the Redistribution Channel,” *American Economic Review*, 109(6), 2333–2367.
- BENHABIB, J., AND A. BISIN (2018): “Skewed Wealth Distributions: Theory and Empirics,” *Journal of Economic Literature*, 56(4), 1261–91.
- BERGER, D., V. GUERRIERI, G. LORENZONI, AND J. VAVRA (2018): “House Prices and Consumer Spending,” *Review of Economic Studies*, 85(3), 1502–1542.
- CAGETTI, M., AND M. D. NARDI (2006): “Entrepreneurship, Frictions, and Wealth,” *Journal of Political Economy*, 114(5), 835–870.
- CAMPBELL, J. Y., AND J. F. COCCO (2007): “How do house prices affect consumption? Evidence from micro data,” *Journal of Monetary Economics*, 54(3), 591–621.
- CIOFFI, R. (2020): “Wealth Inequality and Asset Prices: the Role of Heterogeneous Exposure to Aggregate Shocks,” Working paper, Princeton University.
- COCHRANE, J. (2020): “Wealth and Taxes, part II,” Blog post, available at <https://johnhcochrane.blogspot.com/2020/01/wealth-and-taxes-part-ii.html>.
- FAGERENG, A., M. B. HOLM, B. MOLL, AND G. NATVIK (2019): “Saving Behavior Across the Wealth Distribution: The Importance of Capital Gains,” NBER Working Papers 26588, National Bureau of Economic Research, Inc.
- FEIVESON, L., AND J. SABELHAUS (2019): “Lifecycle Patterns of Saving and Wealth Accumulation,” Finance and Economics Discussion Series 2019-010, Board of Governors of the Federal Reserve System (US).
- GARLEANU, N., AND S. PANAGEAS (2017): “Finance in a Time of Disruptive Growth,” Discussion paper.
- GLAESER, E. L. (2000): “Comments on “Real Estate and the Macroeconomy”,” *Brookings Papers on Economic Activity*, 2000(2), 146–150.
- GOMEZ, M. (2018): “Asset Prices and Wealth Inequality,” Working paper, Columbia University.
- GOMEZ, M., AND ÉMILIE. GOUIN-BONENFANT (2020): “A Q-Theory of Inequality,” Working paper, Columbia University.
- KUHN, M., M. SCHULARICK, AND U. I. STEINS (2019): “Income and Wealth Inequality in America, 1949-2016,” *Journal of Political Economy*, forthcoming, (9).
- MARTÍNEZ-TOLEDANO, C. (2019): “Housing Bubbles and Wealth Inequality,” Working paper, Paris School of Economics.
- MOLL, B., L. RACHEL, AND P. RESTREPO (2020): “Uneven Growth: Automation’s Impact on Income and Wealth Inequality,” Working paper, London School of Economics.
- PAISH, F. W. (1940): “Capital Value and Income,” *Economica*, 7(28), 416–418.

- QUADRINI, V. (2000): “Entrepreneurship, Saving and Social Mobility,” *Review of Economic Dynamics*, 3(1), 1–40.
- SINAI, T., AND N. S. SOULELES (2005): “Owner-Occupied Housing as a Hedge Against Rent Risk,” *The Quarterly Journal of Economics*, 120(2), 763–789.
- WHALLEY, J. (1979): “Capital Gains Taxation And Interest Rate Changes: An Extension Of Paish’s Argument,” *National Tax Journal*, 32(1), 87–91.