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Classic Rational Bubbles in U.K. Housing Markets

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In Giglio, Maggiori and Stroebel (2016), we propose and implement a new test for classic rational bubbles. Such bubbles derive their value from each agent's rational expectation of being able to resell the bubble claims to the next agent. Backward induction ensures that classic rational bubbles can only exist on infinite-maturity assets. Our empirical exercise shows that infinite-maturity claims and 999-year claims for otherwise identical housing assets trade at the same price, and thus rules out the presence of classic rational bubbles. Domeij and Ellingsen (DE) informally propose an alternative equilibrium of a bubble that they claim is consistent with our empirical findings. DE's bubble relies on information frictions such that market participants are unaware of the bubble. Our paper clearly excluded this type of bubble from the scope of our test, and DE's note thus has no implications for the validity of our test. Instead, DE's bubble simply represents one of many possible examples of bubbles on which our test was explicitly silent.

In Giglio, Maggiori and Stroebel (2016) – henceforth GMS – we propose and implement a new test for a class of bubbles that is popular in the theoretical literature: the classic rational bubble in the style of Blanchard and Watson (1982) and Tirole (1982, 1985). The classic rational bubble derives its value from agents' rational expectations of being able to resell the bubble claim at a sufficiently high price, with each agent expecting to sell the bubble to the next agent. It is this expectation of being able to resell the bubble claim that makes agents willing to pay for it in the first place, even though it pays no dividends and thus has zero fundamental value. As a result, the classic rational bubble can only be sustained on infinite-maturity assets: for any finite-maturity asset, no agent would want to hold the bubble in the final period before maturity, and backward induction thus makes it impossible for the bubble to be present in any earlier period.

Our test for classic rational bubbles then compares the prices of infinite-maturity contracts ("freeholds") to the prices of finite but extremely-long maturity contracts ("leaseholds" with maturities close to 1,000 years) across a number of housing markets. The test is based on the observation that the fundamental value (i.e., the present discounted value of rents) of extremely-long leaseholds and freeholds is identical. Any price difference between freeholds and extremely-long leaseholds is thus not due to a difference in fundamental value, but instead due to the (classic rational) bubble term that can only be sustained on the freehold. Similarly, the absence of such a price difference indicates the absence of a classic rational bubble.

GMS find that extremely-long leaseholds and freeholds are priced identically: people pay the same to own a property for 1,000 years as they pay to own the property forever. We therefore conclude that there were no *classic* rational bubbles in the housing markets that we study.

In the paper, we clearly describe the scope of our test and emphasize the many types of bubbles that our test was not designed to detect:

> *"These are not the only models of bubbles, and our paper and test methodology are silent on the possible presence of bubbles that can occur in finite-horizon economies or on finite-maturity assets."* [1]

DE's note informally proposes an equilibrium of a bubble based on incomplete information. Since DE's bubble *can* be sustained on finite maturity assets, it is explicitly outside the scope of our test. Therefore, DE's note has no relevance for the validity of our test.

Recapping the Facts

To understand the equilibrium conjectured by DE, it is important to review four facts about the U.K. housing market. These facts were all discussed in the original paper.

1. 999-year leaseholds and freeholds trade at the same price in the market. Holders of 999-year leaseholds have the right to purchase the freehold through a process called "enfranchisement." The law stipulates that enfranchisements require the leaseholder to compensate the freeholder for the difference in market value between the extremely-long leasehold and the acquired freehold. In practice, when 999-year leaseholds get enfranchised, this is essentially free for leaseholders, both in private market transactions and in court decisions. [2]

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[1] There are multiple other places in the original paper that describe the restrictions to the scope of our test. Importantly, we emphasized that whether a bubble model is within the scope of our test does *not* depend on any definition of rationality, as incorrectly suggested by DE in Section 5.2. Instead, it explicitly depends on whether the bubble can be sustained on finite horizon assets; if it can, it is not within the scope of our test. Our original paper clearly describes the limits of our test:

> *"We use the term "classic" to denote the literature on rational bubbles in the style of Tirole (1985). Other authors have derived bubbles that they also call rational bubbles, but that can occur in finite-horizon economies (see Conlon (2004), Doblas-Madrid (2014)). These latter bubbles are not the subject of our test."*

[2] In their note, DE incorrectly attribute Fact 1 to the *Sportelli* decision. However, enfranchisements of extremely-long leaseholds were essentially free even before the *Sportelli* decision, and are therefore clearly not the result of this court judgment, which focused on the enfranchisement of shorter maturity leaseholds. DE's extensive focus on this decision is thus irrelevant and distracts from the agreement about Fact 1. All that matters for the argument is that enfranchisements are free in practice, as highlighted by Fact 1. In GMS, we also discussed the non-trivial transaction costs for enfranchisements alongside discussing that enfranchisements were free after transactions costs. The point of this discussion was twofold. First, these transaction costs are important to understanding why not all extremely-long leaseholds are enfranchised. Second, the presence of transaction costs highlights that court judgements by themselves, while consistent with the absence of classic rational bubbles, are insufficient to establish that freeholds and extremely-long leaseholds are valued identically.

2. In the presence of classic rational bubbles on freeholds, enfranchisement at zero cost would be against both the letter and the spirit of the law. As DE describe: *the landlord's compensation should equal the compensation the landlord could have obtained from voluntary enfranchisement in a world where the tenant does not have the unilateral right to enfranchise, the so-called "no-act world."*

3. The institutional set-up is such that all parties attempt to implement the law as described in Fact 2. Quoting from DE: *"Lawyers and judges are acutely aware of the law's letter and intent, and they strive to implement the law correctly."*

4. No landlord has ever complained to the courts that they were being illegally expropriated when extremely-long leaseholds get enfranchised at zero cost, despite there being hundreds of lawsuits arguing about other aspects of the enfranchisement process. Quoting from DE: *"Landlords have never complained about having rational bubble values being expropriated."*

These facts are clearly described in GMS, and are agreed upon by all parties.[3] What we disagree about is their interpretation.

Interpreting these Facts

As discussed in GMS, our interpretation of these facts is that there are no *classic* rational bubbles in the U.K. housing market, consistent with the results from our test. In the presence of such bubbles, the enfranchisement of very-long leaseholds at zero price (Fact 1) would have constituted an expropriation that goes directly against the law (Fact 2). Since lawyers and judges would strive to implement the law (Fact 3), they would thus award a compensation to freeholders in accordance with the "no-Act world assumption." If they had not done so, freeholders would have mounted legal challenges to this expropriation, in contrast to the evidence established by Fact 4. Facts 1-4 are thus inconsistent with the presence of a classic rational bubble.

DE agree that our interpretation of no classic rational bubble is consistent with Facts 1-4, but informally propose an alternative interpretation of these Facts in which a bubble can still exist. The central ingredient in this conjectured equilibrium is that agents in the economy do not know about the bubble, or do not understand its properties.

Why does DE's proposal require that agents are unaware of the bubble? This follows directly from Fact 4. If there truly were an illegal, large-scale expropriation of freeholders, why would freeholders not complain about it? DE's response is that *"nobody possessed the necessary*

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[3] In a number of places, DE selectively quote from GMS to suggest that our work is contradictory with respect to whether enfranchisements are free. This is incorrect. GMS clearly described that while enfranchisements are free in practice, they do not need to be free in theory, and could (and should) occur at a positive price in the presence of a classic rational bubble (see page 1080 of GMS).

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expertise to even conceive of a plausible court case." DE also ask: *"Is it really reasonable to expect that anyone with the requisite understanding of the law also possesses theoretical knowledge about issues in rational bubble theory that have not yet been firmly established even within the small group of academic economists that engage with them?"*

In other words, DE suggest that Facts 1-4 are consistent with the presence of a type of bubble in which agents do not have the necessary expertise to understand the bubble (and therefore do not complain when it gets expropriated). Such a bubble obviously is fundamentally different from the classic rational bubble our paper set out to test. Specifically, backward induction does not rule out the bubble proposed by DE – there is no induction to be made about the bubble if agents do not know about or understand the bubble. DE's bubble can therefore be sustained on a finite maturity asset and is thus outside the clearly defined scope of our test.

Conclusions

To conclude, DE's note highlights a central problem of rational bubble theory, namely that it requires assumptions strong enough that the bubble cannot arise on finite-maturity assets; it does not pose a problem to of our test of that theory. Our test was intentionally and explicitly narrow – narrow in the sense that it focused on exclusively testing for classic rational bubbles that have enjoyed substantial popularity in the theoretical literature. Like any theory, this class of bubble models comes with a very particular set of assumptions; and, like any test of a model, we designed a test that works under the assumptions of the model. The entire point of our paper was to highlight that this class of bubble models does not describe reality: people are not willing to pay substantially more for an infinite claim to a property than they are willing to pay for a 999-year claim to the same property, as classic rational bubbles models would imply. If our test can continue to push the literature to abandon the assumptions behind the classic rational bubble in order to match our empirical evidence, then our paper has been a success.

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