Homeowner-made Housing Price Bubbles

- *East Germany's Example* -

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Discussion Paper Series

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by

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Abstract: This paper argues that homeowners, if sufficiently influential, may attempt to manipulate housing prices. The paper presents an instance of, and sets out the political economy behind, one particular homeowner-made housing price bubble (in East Germany). Yet ultimately the paper suggests that homeowners may be responsible for housing price bubbles elsewhere, too. Namely, US homeowners may be the single driving force behind the latest US housing price boom that preceded the current real estate, and financial, crisis.

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1 Introduction

Many different explanations have been suggested to explain the US housing price boom that preceded the current crisis: loose monetary policy, financial markets' deregulation, and subprime lending among them. However, could it not be that these explanations all go back to a single driving force behind them? Maybe, so one might surmise, it is US homeowners (a majority of the US electorate) who explicitly encouraged loose monetary policy, financial deregulation, and excessive subprime lending. In so doing, US homeowners in the end may have generated the massive surge in house prices.

Establishing such a link must be challenging enough, of course. Not just would one need to explain why rational homeowners stimulate housing prices if they are not also able to sustain them. Also, a full political economy model would have to explain how homeowners exert political influence in the various policy fields. Instead of taking on this task this paper turns to a more modest one. This paper addresses homeowners' role in generating, and maintaining, a housing price bubble in East Germany. While institutions there clearly are very different from those in the US, the idea of homeowners actively steering housing prices (when sufficiently influential) may nonetheless shine through strongly enough to merit attention elsewhere, too.

At the outset, note that East Germany's rent is almost as large as West Germany's. At the same time one sixth of the Eastern housing stock (or, for the unfamiliar reader, roughly one million apartments) are vacant. From this paper's perspective, East Germany's rent represents a "bubble", and an unburst one at that. This interpretation is novel to the discussion of East Germany's rent. To sociologists, economic geographers and urban planners, current East German rent does not appear particularly large. To these observers current rent merely reflects suppliers' need to repay the cost of modernizing the Eastern housing stock, following the German Democratic Republic's demise in 1989.

Yet sunk modernization investment surely cannot explain current rent. This paper offers an alternative, political economy type explanation. In essence, this explanation proceeds in two steps. First, for legal reasons modernizing the East German stock early on translated into larger rent. Then those East German renters who felt that modernization brings them little benefit must have preferred to become homeowners in response, or even to leave for Germany's West altogether. Given that modernization was intense, a homeowner majority emerged in Germany's East. This homeowner majority now opposes ever reducing rent below the "cost covering" level, for fear of having to contribute to the deficit that would inevitably result if rent fell.

And second, fear of having to contribute to modernization cost may even explain modernization itself. Germany's, as opposed to East Germany's, electorate must have been reluctant to settle on a degree of Eastern modernization inconsistent with homeowner majority there. Moderate modernization would have left East Germany's renters, rather than her homeowners, in control. So Germany's electorate early on

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may have fixed modernization at a far larger level (at the minimum level necessary to ensure homeowner majority in the East, to be precise). This larger level, and this level only, could ensure not having to contribute to the deficit that would have resulted otherwise.

The paper's equilibrium closely corresponds to what can be observed today: Modernization is intense, homeownership one half, vacant housing vast, and high rent persistent. High rent is persistent because East Germany's surge in the homeownership rate acts like a ratchet, "petrifying" rent. To emphasize, this surge in homeownership is far from being accidental. Instead, it is the intended outcome of a modernization strategy which puts East Germany's homeowners in charge of safeguarding cost covering rent.

As much as 40% of Eastern rental housing is public. At the surface, this may answer the question of why there is no downward price adjustment by pointing to a lack of competition. Yet this immediately raises another, and key to this paper. Why do local governments not make their public housing corporations reduce local rent (in particular in view of the likelihood that a sizeable fraction of the resulting deficit may be picked up by tax payers throughout Germany)? Why do neither political parties, nor media, nor renters' associations voice any protest?

As a little "field experiment" in policy advice, two articles in one of Germany's national dailies (Dascher/Ribhegge (2005) and Dascher (2008)) have proposed to lower rent. While expecting a substantial response would surely have been naive, observing the zero response there was was equally surprising. Zero response would be consistent with (non-economic) explanations based on voter indifference to, or on voter belief in the irrelevance of, falling rent. But zero response would also be consistent with a political equilibrium in which a majority defend high rent against any local proposal to abandon it while the corresponding minority do not protest because they understand the futility of protesting against a decision taken by the median. It is such an equilibrium that is at the heart of the paper.

This equilibrium also clarifies why any suggestion to reduce rent today, if only by a little amount, must fail. East Germany's homeowners must fear any small reduction in rent for two reasons. Their first fear must be that a small reduction in Eastern rent will move Eastern public housing into deficit (discussed above). Yet there even is an added fear over and above this standard caveat of policy reform. Homeowners' second fear must be that a small reduction in rent will attract renters from elsewhere, thus shifting the balance of power in East back to Eastern renters. Modest looking reductions in Eastern rent may quickly accelerate into fearsome reductions in Eastern rent.

Let us briefly look into the triple facts on rent, vacancies, and homeownership. Note that these facts are not stylized; rarely do simple data speak out so clearly. At reunification East's average rent was very low.[2] But as early as 2002 it had almost

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[2]Following Housing Commission (1995), East's 1990 rent averaged (in 1990 prices) 70 cents/sqm.

	2002	2006
West Germany	5.9	6.1
East Germany	5.2	5.6

Table 1: Average Rent per sqm [€] (Timm (2008), Table 6)

risen to the then-prevailing level in West (Table 1).[3] At the same time excess supply in Eastern housing grew rapidly, to the extent that roughly one sixth of all Eastern housing had become vacant by 2002 (Table 2). By 2006 the vacancy rate had dropped to 12 percent, yet surely would have exceeded one sixth had it not been for the demolition of close to a quarter of a million apartments in the intervening years. This coincidence, of vast tracts of vacant housing with rent nearing the West German level, motivates the paper's view that Eastern rent today is excessive.

	2002	2006
West Germany		3.2
East Germany	16.2	12.4

Table 2: Vacancy Rate [%] (GdW (2006))

Rising rent has induced many of East's households to acquire a home of their own. This rise in the homeownership rate has reinforced the ranks of those who should oppose any fall in rent. Table 3 documents the rapid increase in East's homeownership rate, up from app. 28% in 1993 to over 39% by 2003. While it is true that homeowners do not constitute a majority of the East German electorate, they certainly have come very close to constituting one. Throwing in the fact that Germany's homeowners are more likely to vote (Glaeser/diPasquale (1999)) suggests that the median voter is a homeowner.[4] Within a median voter framework, any policy proposal to reduce rent would fail in the political arena.

Standard comments on East Germany's housing argue that reunification has driven emigration from Germany's East.[5] Reducing rent would not hold emigrants back.

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[3]A similar picture emerges when consulting average rents documented by the German SocioEconomic Panel (SOEP) as in Dascher (2008a), or when looking at anecdotal evidence collected at the local level (e.g., Klupp et al. (2004)).

[4]One might argue that, following Table 3, in 2003 the national homeownership rate had bypassed the critical level, too, after having dropped below it due to reunification. This may be useful in explaining recent swings in policies relevant to real estate, such as tax breaks for commuters.

[5]What is referred to as the standard model here in fact is a collection of views held by regional planners and economic geographers. BMVBS (2006), GdW (2007) and Bernt (2009), while differing

	1993	**2003**
West Germany	50.5	51.1
East Germany	27.7	39.1

Table 3: Homeownership Rate [%] (Kott/Krebs 2004, Table 3)

Instead, reducing rent could even endanger funding further, and badly needed, improvements in the housing stock. Here we completely reverse this link between migration and rent. Following this paper, large Eastern rent is an important driver of emigration and vacant housing.[6] Improvements in the housing stock, while costly, benefit residents little and hence only increase the pressure to leave. These different views on causality extend to different views on the role of homeownership. Following the standard model, large homeownership is beneficial. Following this paper, in contrast, it is the very coalition of Eastern homeowners that prevents public housing rent from falling.

Section 2 sets out the effect of modernization on the homeownership rate in East Germany. Section 3 explains the simultaneous interaction between the homeownership rate on the one hand and the politics of Eastern rent on the other hand. Section 4 extends discussion to the extent of modernization, and also considers comparative statics of equilibrium. Section 6 concludes.

2   The Model

This section describes households' simultaneous choice of how to be housed and where to live. There are two regions, Germany's East and her West. Variables relating to West (East) are given in capital letters (small type); while variables pertaining to both regions are given in small type throughout. East's (West's) household total is l (L), and total population $l + L$ equals one.

Reflecting the two Germanys' very different histories, ownership of rental housing follows a simple rule. Rental housing in West is equally distributed among homeowners in West, and thus "private"; while rental housing in East is owned by East's government, and "public" hence.[7] Regional wages in East and West are w and W, while regional lump sum taxes needed to finance regional public goods in East and

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in details, give a fairly representative summary of these views.

[6]Simon/Namura (2009) even find that living in more expensive regions actually reduces fertility. From this perspective, large Eastern rent contributes to vacant housing also by aggravating the ongoing demographic crisis.

[7]This rule excludes the potentially important case of homeowners in West owning homes in East. Yet in fact including this case strengthens the model's results (section 5).

West are t and T, respectively. Wages and public goods are exogenous. In particular, neither does the regional wage fall should the region's population rise nor do regional public goods exhibit any rivalry in consumption.[8]

Households in East take as given modernization. Let c represent the cost of maintaining one apartment. Further, let $\overline{r}$ denote the rent that just covers maintenance and modernization cost. That is, $\overline{r}$ is "cost rent". This paper's cost rent simply is the smallest among all rents permitting housing investors to recover their investment. Fundamentally, cost rent $\overline{r}$ certainly need not coincide with true rent r. Moreover, observe that modernization investment $(\overline{r} - c)$ is irreversible. These sunk costs play an important role below. Sunk costs reduce society's consumption set, initiating a distributional struggle over who contributes least to this reduction.

Households in East may choose between three different actions. They may stay in East and rent an apartment there; they may stay in East and buy a home; or they may move into rental housing in West. Households, however, may not buy a home in West.[9] Next, households differ in their mobility to move across regions (mobility cost) and in their benefit from living in a house of their own (homeowning talent). Specifically, households are uniformly distributed with respect to mobility cost m and homeowning talent z, with $(m, z) \in [0, \overline{m}] \times [0, \overline{z}]$, where $\overline{m}, \overline{z} > 0$. To be sure, homeowning talent may alternatively also be interpreted as an individual distaste for residing in rental housing.

Homes are supplied by a competitive fringe of developers, at price p, and public rental housing is supplied at cost rent, $\overline{r}$. Let δ be a dummy variable that assumes the value of 1 if Eastern voters lower public housing rent, and 0 otherwise. Observe that lowering public housing rent will move East into deficit. Financial reserves absent, this amounts to defaulting on (part of) modernization debt. Below we will restrict attention to the case where Eastern rent is lowered right down to operating cost.[10] Let τ denote the cost of default to any citizen should East default.[11] Surely even in the case of default Eastern renters may still be held liable for some fraction α of modernization cost.

While improvements in Eastern public rental housing quality certainly should make residents better off there are two reasons why this ultimately may not translate into higher utility. First, public housing residents are likely to suffer when confronted with the true cost of these improvements, as is well known from the literature on public

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[8]Neoclassical theory would suggest that wages should fall following immigration, while a new economic geography model accounting for agglomeration economies might suggest that wages could even rise. Assuming constant wages amounts to choosing middle ground between the two extremes.

[9]This assumption relies on the idea that buying a house in a region one is not familiar with simply is too costly. The assumption, to be sure, is important and underlies many of the paper's results.

[10]If a majority of households decide on lowering rent, then they might as well lower rent as much as they can (section 4).

[11]Then, as is obvious from (1), τ does not distort households' choices between the different options.

housing (e.g., Olsen (1983)).[12] This must be particularly true for East Germany's slab type rental housing for which quality improvements are limited from the start.

Even when modernized these flats continue to not be soundproof, to suffer from monotonous views, etc. If tenants are forced to pay the true cost of the extra quality imposed on them then they are made worse off, to the extent that some of them either leave for Germany's West or move into housing of their own. And, from a somewhat different perspective, second, we may view East Germany's modernization endeavor as an attempt to make Eastern housing satisfy higher, i.e. West German, standards. Satisfying these standards can be very costly yet need not generate substantial benefits to tenants never involved in the decision on which standards actually are adequate for them.

For these two reasons, and for modeling simplicity, we completely drop housing quality from our description of indirect utility from Eastern rental housing. (Alternatively, public housing rent r may be thought of as capturing the net effect of quality and concomitant cost rent.) Depending on location and tenure choice Eastern household's utilities are

$$
U = \begin{cases} v(g) & + w & - t - p + z - \delta\,\tau & \text{buying} \\ v(g) & + w & - t - \bar{r} & - \delta(\tau - (1-\alpha)(\bar{r}-c)) & \text{renting} \\ V(G) & + W - T - R - m - \delta\,\tau & \text{emigrating} \end{cases} \tag{1}
$$

Note that improved public housing quality in East does not explicitly enter into utility when renting. And, throughout this section δ and $\bar{r}$ are given. The following two sections then take up the issue of endogenous δ and $\bar{r}$.

Households indifferent between the two modes of tenure exhibit homeowning talent z of

$$
\widetilde{z}(\bar{r}, \delta) \;=\; p - \bar{r} + \delta(1-\alpha)(\bar{r}-c) \tag{2}
$$

where $\widetilde{z}$, a function of $\bar{r}$ and δ, is just so written. Figure 1's panel (a) graphs $\widetilde{z}(\bar{r}, \delta)$ for given $\bar{r} = \bar{r}'$ and $\delta = 0$. (The parts of the graph that are not relevant below are suppressed.) Ceteris paribus, increasing $\bar{r}$ or decreasing δ shifts the locus downwards. This must conform with intuition. Renting becomes ever less attractive the more intensive (useless) modernization becomes, and the less probable default is.

Households indifferent between staying a renter in East and moving into rental housing in West exhibit migration costs m of

$$
\widetilde{m}(\bar{r}, \delta) \;=\; \Delta + (\bar{r} - R) - \delta(1-\alpha)(\bar{r}-c) \tag{3}
$$

after setting $\Delta = (V(G) - v(g)) + (W - T) - (w - t)$, representing West's gross advantage. Figure 1's panel (a) also illustrates the graph of $\widetilde{m}(\bar{r}, \delta)$, again for $\bar{r} = \bar{r}'$ and $\delta = 0$. Holding everything else equal, this locus clearly shifts to the right as either $\bar{r}$ rises or δ falls. Here, too, the intuition is clear. Greater modernization

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[12]Hübl/Möller (1996, p. 69) provide an early comparison of modernization costs with willingness-to-pay, and caution against overly ambitious modernization.
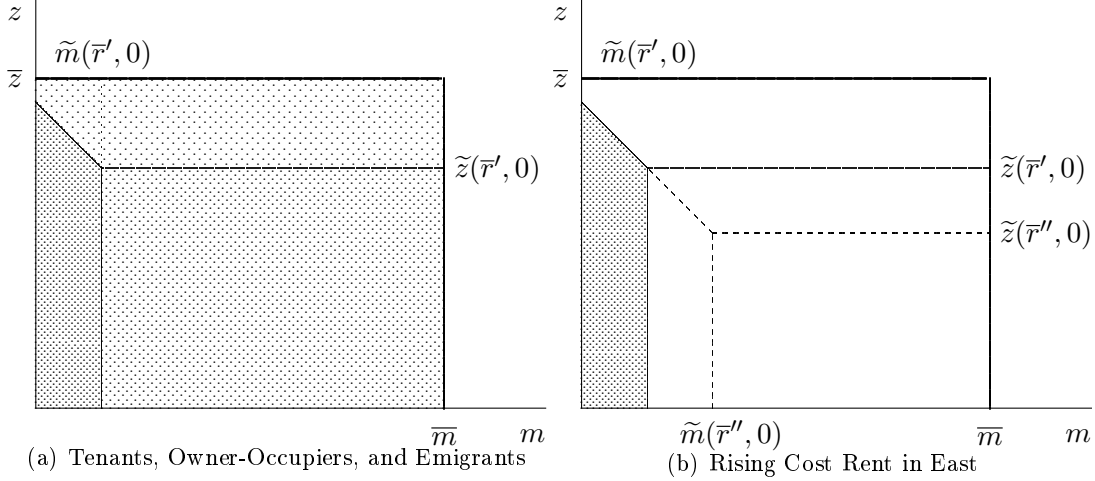
Figure 1: Illustrating Household Allocation

– through the greater expected burden anticipated to come along with it – makes individuals more inclined to head off to West.

The third locus represents indifference between emigration to West and buying property in East. We let $\widehat{z}(\overline{r}, \delta)$ denote critical homeowning talent in this context, with

$$\widehat{z}(\overline{r}, \delta) \; = \; \widetilde{z}(\overline{r}, \delta) + \widetilde{m}(\overline{r}, \delta) - m. \tag{4}$$

and where we make use of the definitions (2) and (3) just introduced. In Figure 1's panel (a), $\widehat{z}(\overline{r}, \delta)$ is the downward sloping graph. This graph is not subject to any variation in either $\overline{r}$ or δ.

Figure 1's panel (a) not just points to those who want to buy property (the lightly shaded area) and to those who prefer to rent (the not so lightly shaded area). It also reveals the number of those wanting to leave for West (the dark shaded area), denoted $E(\overline{r}, \delta)$.[13] Figure 1's panel (b) then illustrates how further modernizing public housing affects the volume of emigration. Pushing $\overline{r}$ further up, to $\overline{r}''$, shifts the $\widetilde{z}$-locus down and the $\widetilde{m}$-locus to the right, increasing the number of those who want to emigrate. Likewise (though not drawn), making δ switch from 0 to 1 shifts the $\widetilde{z}$-locus up, and the $\widetilde{m}$-locus to the left, clearly reducing the number of those who want to leave. To summarize, $E(\overline{r}, \delta)$ is increasing in $\overline{r}$, and decreasing in δ.

We turn to housing supply in West. Anyone can provide an additional unit of housing at cost d, where $d > c$. Western supply is perfectly elastic at d. Emigration from East driven by increases in Eastern cost rent does not raise the equilibrium rent in West.[14]

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[13]Specifically, $E(\overline{r}, \delta) = \widetilde{m}(\overline{r}, \delta)\, \widetilde{z}(\overline{r}, \delta) \; + \; 0.5(\widetilde{m}(\overline{r}, \delta))^2$.

[14]This takes away the potential incentive for Western homeowners to drive up cost rent in East in order to raise rent in West. Incorporating the possibility that supply of Western housing to Eastern emigrants is upward sloping would permit rent in West to rise.

3 Homeownership and the Politics of Debt Default

Eastern modernization's effects on local politics begin to shine through. Greater modernization in East, so we emphasize, affects Eastern politics because it biases the Eastern electorate's division into homeowners and renters, towards homeowners. This section then permits Eastern politics to play an active role. Eastern voters may not have had a say in the extent of costly modernization. Yet today they may try to reduce Eastern rent. Hence, while it is true that the likelihood of debt default δ affects households' decisions on whether they want to stay in East and how they want to be housed (the previous section), it must also be true that tenure and location choices feed back into the size and composition of the Eastern electorate, and hence into the likelihood of debt default δ. This section's interest is in the analysis of this simultaneous interaction. I.e., δ now is endogenous.

Defaulting on public housing debt implies that modernization cost of every unit still inhabited, $(\bar{r} - c)$, will shift to the general public. Given that the number of public housing apartments modernized are $l - E(\bar{r}, \delta)$, every citizen needs to put in

$$\tau \;=\; (1 - \alpha)(\bar{r} - c)(l - E(\bar{r}, \delta)), \tag{5}$$

irrespective of his residential location or housing tenure mode.[15] Eastern rent now becomes $\alpha c + (1 - \alpha)\bar{r}$, being a weighted average of maintenance cost c and full cost rent $\bar{r}$.

Aware that default will benefit them, Eastern renters will vote for it; while Eastern homeowners, aware that defaulting on public housing debt will hurt them, will vote against it. Different views as to who pays for modernization costs previously sunk translate into different voting behavior across renters and owner-occupiers. With δ endogenous households continue to decide on location and mode of tenure but they also do so bearing in mind the impact of their location and tenure decisions on the Eastern electorate's subsequent take on default.

In particular, households anticipate the crucial role of the homeowner share in subsequent regional voting on whether or not to default on public housing debt. Eastern households cannot anticipate the location and tenure decisions all other Eastern households take. So they enter simultaneous play. Just which type of game they play then depends on the level of $\bar{r}$. It turns out to be useful to distinguish between little modernization, $(\bar{r}' - c)$ (both panels in Figure 2); intermediate modernization $(\bar{r}'' - c)$ (panels in Figure 3); and intensive modernization, $(\bar{r}''' - c)$ (Figure 4).

Consider the low $\bar{r}$ scenario first. For $\bar{r}'$ it is straightforward to indicate a Nash equilibrium of the game. In Figure 2(a), the lightly shaded area represents those who rent public housing in East; the heavily shaded area those who buy property in

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[15]Alternatively we could assume that only residents in East have to carry these costs. This would strengthen Eastern homeowners' opposition to debt default (but it would also further distort the migration decision).
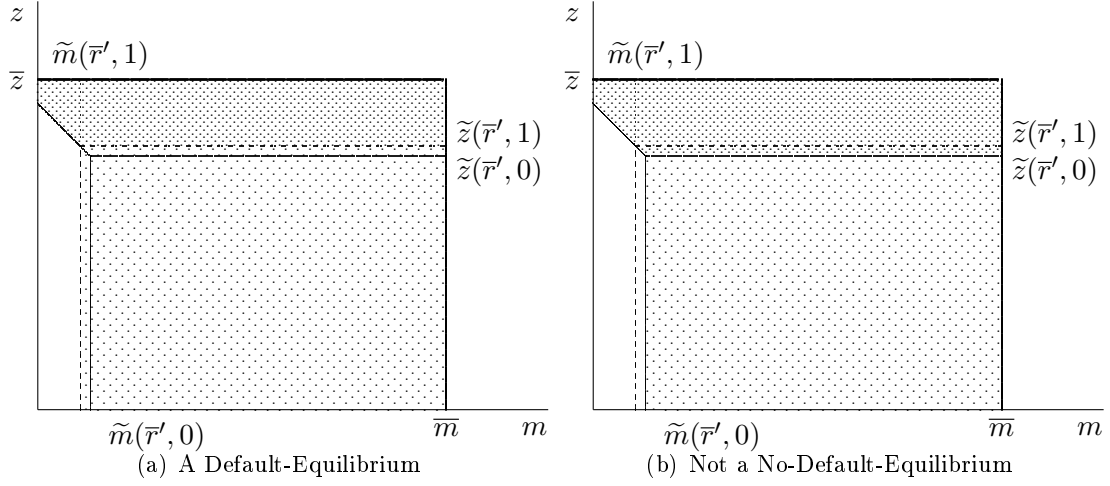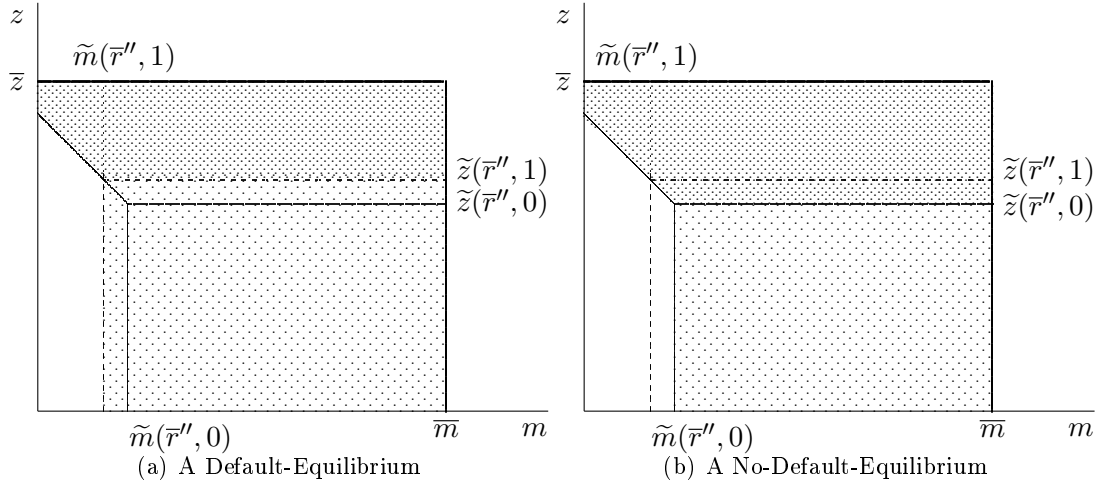
Figure 2: Little Modernization ($\overline{r} = \overline{r}'$)

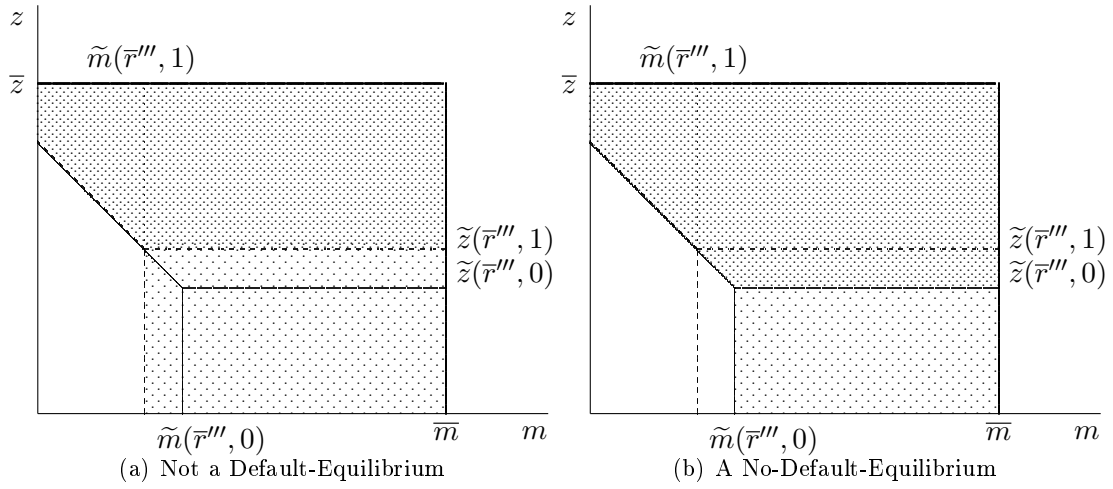Figure 3: Moderate Modernization ($\overline{r} = \overline{r}''$)

Figure 4: Intensive Modernization ($\overline{r} = \overline{r}'''$)

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East; and the non-shaded area those who leave for West. Clearly those who rent in East constitute a majority of those who remain in East: As drawn, the lightly shaded area exceeds the heavily shaded area. This majority will default on modernization investment. Then it is dashed – rather than bold – loci that matter. Yet given the dashed loci no household in East will want to do anything else but what he was assigned to do above. Figure 2(a) captures a Nash equilibrium of the game.

This equilibrium of the game is unique. Geometrically speaking, a Nash equilibrium must satisfy the following two conditions: (i) Shaded areas that describe household choices must align with the relevant loci. (Otherwise some household could be better off by switching to some other tenure mode or location choice.) And, (ii) relevant loci can be found by consulting areas' relative size. (If the heavily shaded area is larger (smaller) than the lightly shaded one, then the bold (dashed) loci apply.) Figure 2(b) illustrates an allocation of Eastern households for which condition (ii) is not satisfied. There even more households choose to become homeowners, and even more of those who would rent otherwise leave for West. Even though this favors the group of homeowners in East, the resulting homeownership share still falls short of the 50% quorum. Anticipating this, many households will want to break away.

We conclude that for $\bar{r}$ low many households emigrate and not many households buy property, leaving the group of renters in control of the subsequent decision on whether to reduce public housing rent or not. The resulting rent r' becomes $\alpha c + (1 - \alpha)\bar{r}'$. Alternatively, consider the large $\bar{r}$ scenario next (Figure 4). Similar reasoning as above shows that for $\bar{r}'''$ the game has but one Nash equilibrium, as depicted in Figure (5b). This equilibrium now puts homeowners in control. Equilibrium rent r''' equals cost rent, $\bar{r}'''$. Again, allocations where households make choices in line with the "wrong" loci cannot be equilibria. (One such disequilibrium in the context of $\bar{r}$ being large is illustrated in Figure (4a).)

At last consider the scenario of moderate modernization, where $\bar{r}$ assumes an intermediate value, $\bar{r}''$ say (Figure 3). Now Nash equilibrium is no longer unique; instead equilibria are multiple. As drawn, Figure (3a) shows an allocation where households' choices based on expecting default will generate a majority of voters speaking out for default. Then equilibrium rent r'' equals $\alpha c + (1 - \alpha)\bar{r}''$. (The lightly shaded area clearly is larger than the heavily shaded area.) Alternatively, Figure (3b) shows an allocation where households' choices based on expecting no default will generate a majority of voters opposing default. (The heavily shaded area is meant to be slightly greater than the lightly shaded area.) Then equilibrium rent r'' just equals cost rent, $\bar{r}''$. In either scenario no individual will want to change his mind as long as noone else changes his.

We now make precise our distinction between low, intermediate, and large values of $\bar{r}$. Note first that diagrammatically East's homeownership share is the ratio of the heavily shaded area to the lightly shaded area. This ratio is strictly increasing, and continuous, in $\bar{r}$.[16] Moreover, this ratio is smaller than 0.5 for $\bar{r}$ close to c while

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[16]This is because the area in the numerator of the homeownership share is strictly increasing and

larger than 0.5 for $\bar{r}$ sufficiently large. But then by the intermediate value theorem there must exist some value of $\bar{r}$ for which the homeownership share equals 0.5. This value equates the number of homeowners (proportional to the r.h.s. of the following equation) to the number of renters (proportional to its l.h.s.):

$$\left(\overline{m} - \widetilde{m}(\bar{r},\delta)\right)\widetilde{z}(\bar{r},\delta) \quad = \quad \left(\overline{z} - \widetilde{z}(\bar{r},\delta)\right)\overline{m} \; - \; \left(\widetilde{m}(\bar{r},\delta)\right)^2\big/2 \qquad (6)$$

making use of (2) and (3). Let $\bar{r}_\delta$ denote this critical value (of which we can be sure that it exists). Intuitively, $\bar{r}_\delta$ proxies the minimum modernization needed to (turn sufficient numbers of households off becoming renters in East to) make any subsequent proposal of default fail.[17] This critical value depends on δ. Surely $\bar{r}_1$ is strictly smaller than $\bar{r}_0$. Intuitively, the extent of modernization needed to frighten away sufficient numbers of potential renters, $\bar{r}_\delta$, must be greater if renters can be certain to be able to default on much of the initial investment later.

Let us combine the intuition gained from the Figures with the critical values just introduced: For $\bar{r}$ strictly smaller than $\bar{r}_1$, the only Nash-equilibrium is the one where East defaults (Figure (2a)). Then Eastern rent is $c(1 - \alpha) + \alpha\bar{r}$. Next, for $\bar{r}$ strictly greater than $\bar{r}_0$, the unique Nash-equilibrium is the one where East does not default (Figure (4b)). Here Eastern rent is $\bar{r}$. And finally, for $\bar{r}$ between the two critical values two Nash-equilibria coexist, where Eastern rent is either $c(1 - \alpha) + \alpha\bar{r}$ or $\bar{r}$. To summarize more compactly,

Proposition 1 (Homeownership Rate and Debt Default): *Little (expensive) modernization in East induces a small (large) homeownership rate in East; which in turn makes Eastern voters' default on modernization debt more (less) likely. Loosely speaking, expensive – and only expensive – modernization pays its way.*

Since $\delta(\bar{r})$ and $r(\bar{r})$ assign two values to intermediate cost rents they are correspondences. Whenever both, default and no default, are equilibrium outcomes then default seems the more plausible outcome, given that historically renters predominate and cost rent is low. With this assumption the probability of East defaulting δ, Eastern rent r and default tax τ become

$$\delta(\bar{r}) \quad = \quad \begin{cases} 1 & \text{if} & \bar{r} < \bar{r}_0 \\ 0 & \text{if} & \bar{r}_0 \leq \bar{r} \end{cases} \quad , \qquad (7)$$

$$r(\bar{r}) \quad = \quad \begin{cases} c(1 - \alpha) + \bar{r}\alpha & \text{if} & \bar{r} < \bar{r}_0 \\ \bar{r} & \text{if} & \bar{r}_0 \leq \bar{r} \end{cases} \quad \text{and} \qquad (8)$$

$$\tau(\bar{r}) \quad = \quad \begin{cases} \tau & \text{if} & \bar{r} < \bar{r}_0 \\ 0 & \text{if} & \bar{r}_0 \leq \bar{r} \end{cases} \qquad (9)$$

Eastern rent is, joint with Western rent R, sketched in Figure 5's panel (a). It is strictly increasing in $\bar{r}$, and discontinuous at $\bar{r}_0$. And of course, Eastern and

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continuous in $\bar{r}$ while the area in the denominator is strictly decreasing and continuous in $\bar{r}$.

[17]More precisely, the modernization investment needed is given by $(\bar{r}_\delta - c)$.
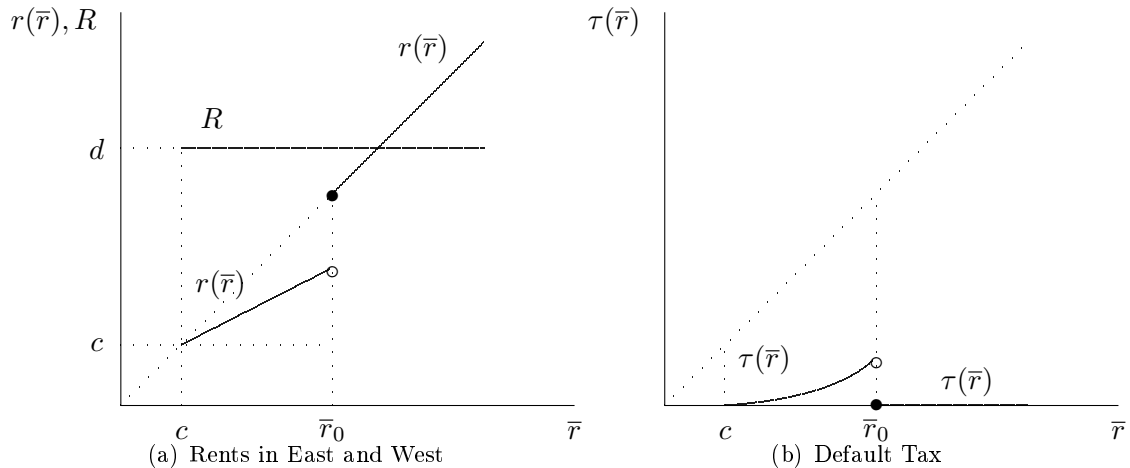
Figure 5: Equilibrium Rents in East and West, and Default Tax

Western rent converge. The greater is cost rent, the smaller the initial advantage of Western rent over Eastern rent becomes. Figure (5a) reveals that for $\bar{r}$ greater than $\bar{r}_0$ Eastern cost rent is self-fulfilling. Sufficiently large Eastern cost rent produces an actual Eastern rent of identical value. However, panel (a) also shows that for $\bar{r}$ smaller than $\bar{r}_0$ Eastern cost rent will not translate into an equal sized actual rent.

Which among the many possible cost rents is the relevant one? Two interpretations are possible. We might always argue that "accident", or "history", has fixed $\bar{r}$ at some level. Since homeownership in East Germany today has effectively surpassed one half (section 1), history must have fixed $\bar{r}$ at some value slightly greater than, or equal to, $\bar{r}_0$. This would explain why Eastern rent does not, and will not, fall. The majority of the Eastern electorate today are not renting, and thus are unwilling to contribute to the modernization cost bill. Alternatively, we might go one step further. We might wonder whether $\bar{r}$, rather than accidentally being set such that homeownership attains one half, might have strategically been fixed by the national electorate. The following section explores this idea.

4   Strategic Modernization and Large Rent's Persistence

Suppose the national electorate is able to fix the extent of Eastern modernization, $(\bar{r} - c)$, at reunification.[18] This electorate should plan Eastern modernization carefully. If it imposes too little modernization investment, then even this little invest-

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[18]In the early years following unification, public housing corporations were permitted small rent increments only. Having had to service debt incurred during earlier German Democratic Republic rule while at the same time being prohibited to generate any substantial revenue of their own quickly forced local public housing corporations into deficit. A law introduced in response, in 1993, the *Altschuldenhilfegesetz* seemingly purported to offer relief but effectively imposed modernization. Housing companies' debt would partly be waived only if public housing corporations (i) quickly modernized, and (ii) pursued fast privatization of, their stock. At the same time rents would be allowed to rise much stronger only if matched by costly investments into satisfying higher standards. For full details see BMJ (1993).

ment will to a large extent be defaulted on (for failing to ensure a politically viable homeownership rate in East), generating an additional tax burden. If, in contrast, it imposes strong modernization then the correspondingly large investment cost will be borne by Eastern renters only.

Figure (5b) makes the national electorate's reasoning explicit. Note that the median voter is a household residing in West. Suppose that this median voter must, for constitutional reasons and in line with the reunification treaty's stipulations, decide on some strictly positive modernization effort. Then choosing $\overline{r}_0$ certainly identifies one optimal choice. No other cost rent can improve upon $\overline{r}_0$. Now, this optimum is not unique. Any cost rent above and beyond $\overline{r}_0$ will also do, as shown in Figure (5b). Assuming lexicographic preferences over $(-\tau, -r)$ on the part of Western voters will identify $\overline{r}_0$. The majority of Western voters choose the smallest among all the cost rents that ensure modernization debt repayment.

This equilibrium corresponds well with the homeownership share currently found in East. If weighted by higher likelihood to turn out, East's 40% homeowners may command just over 50% of the votes, as predicted by the model. Second, this also matches up with the fact that virtually no opposition contests current rents. Third, equilibrium predicts a strong interregional convergence in rents, produced by the strong increase in Eastern rent.[19] Fourth, equilibrium exhibits a large fraction of vacant housing, left behind by those pushed into emigrating by unnecessarily high rent. This, too, accords well with the evidence (Table 2).[20] For reference,

Proposition 2 (Modernization, Emigration, Homeownership, and Rents):
The model's equilibrium exhibits:
(i) (Substantial Modernization:) Western and Eastern voters jointly fix modernization investment into each unit of Eastern public rental housing, at $(\overline{r}_0 - c)$,
(ii) (Substantial Emigration:) Eastern households with mobility cost below $\widetilde{m}(\overline{r}_0, 1)$ and homeowning talent smaller than $\widehat{z}(\overline{r}_0, 1)$ move into rental housing in West,
(iii) (Homeownership Share One Half:) Eastern voters, as those remaining, almost evenly divide into homeowners and renters, with the median being a homeowner,
(iv) (Debt Default Rejection:) Eastern voters, as those remaining, strike down any proposal to default on modernization debt,
(v) (Rent Convergence): Eastern equilibrium rent r just equals critical cost rent $\overline{r}_0$. Eastern rent converges to the Western level, R.

Further equilibrium properties derive from varying public goods provision, introducing subsidies to homeownership, and demolishing part of the vacant, or even non-

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[19]Figure (5a) suggests that Eastern rent falls short of Western rent. This not necessarily is the case, Eastern rent may also exceed Western rent. As argued in the introduction, quality adjusted average rent in Germany's East may actually exceed that in Germany's West (section 1).

[20]Reich (2000) and Steinert (2000) point to overall modernization investment into Eastern public housing having attained 40 billion Euro by the end of 2000.

vacant, stock.[21] Consider first an increase in g, representing the huge investment into Eastern infrastructure. Intuitively, this improvement translates into a higher $\bar{r}_0$. The reason is that better regional public good provision in East convinces more to reconsider their decision to leave for West, and that among those who reconsider the share of renters is greater. But then the $\bar{r}_0$ necessary to engineer a homeownership share of one half must be higher. Since equilibrium rent equals $\bar{r}_0$ the underlying increase in regional public goods translates into larger Eastern rent. For a region boasting vast vacant housing such "capitalization" must be surprising.

Next, consider subsidizing homeownership. In terms of the model, this is captured by a drop in the price of a home, p. At each level of cost rent, $\bar{r}$, the number of those wanting to stay and buy a house rises. Hence the critical cost rent $\bar{r}_0$ can afford to be smaller. Subsidizing homeownership reduces Eastern rent.[22] Finally, let us turn to demolition. If demolition affects vacant flats only, then demolition has no effect on Eastern rent. Alternatively, once demolition turns to public housing still partly inhabited then numerous renters are forced to move.[23] Once forced to move, those uprooted may leave altogether. Then demolition in fact reduces the number of renters in East. For this reason equilibrium Eastern rent may fall.[24] To summarize,

Proposition 3 (Public Goods, Homeownership Subsidies, Demolition):
Comparative Statics reveal the following changes in equilibrium values:
(i) (Public Good Improvement): Eastern rent is increasing in the regional public good. Capitalization occurs in spite of excess housing.
(ii) (Homeownership Subsidies): Eastern rent is decreasing in the level of homeownership subsidies.
(iii) (Demolition): Eastern rent is invariant to demolition of vacant apartments. However, if demolition razes inhabited apartments also then Eastern rent falls.

In equilibrium Eastern rent cannot fall short of $\bar{r}_0$. Let us take a brief, somewhat speculative, look beyond equilibrium. Once modernization has taken place the desired homeowner majority in East emerges as planned. Consider now a small, unexpected reduction in Eastern rent. Such a reduction is feasible since r is administered

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[21] These variations are treated as being expected by all those involved in equilibrium.

[22] Homeownership subsidies are complemented by efforts to privatize East Germany's public housing stock. For instance, public housing corporations in Germany's East would only be eligible for federal debt relief if they would agree to privatize a certain fraction of their stock (BMF). From a benevolent perspective, these efforts may simply try to enlist more households into socially productive owner-occupiership. From this paper's perspective, alternatively, these efforts may also be interpreted as an intervention designed to reduce the critical threshold beyond which the homeowner majority becomes certain.

[23] While vacant apartments cluster in particular blocks of housing, rarely are these blocks completely vacant. Demolishing them always requires expelling some renters.

[24] This contradicts the prediction of a filtering model, in which demolition makes renters move into the next higher segment of housing rather than leave altogether (Dascher (2008a)). In part this difference in predictions is due to an assumption in this paper, i.e. that Eastern rental housing is only available in a single quality.

rent in public housing. Homeowners must fear such a small reduction in rent for two reasons.

Their first fear must be that a small reduction in Eastern rent will move Eastern public housing into deficit (section 4). More pressing yet, their second fear must be that a small reduction in rent will (i) convert Eastern homeowners into Eastern renters as well as (ii) attract renters from Germany's West, thus tilting the balance of power in East towards renters and ultimately triggering further, much stronger reductions, in rent.[25] Are these fears justified? Now, with this paper's model those who have chosen to become homeowners earlier will not want to move back into public rental housing since there is no one whom they could sell the house left behind.

Yet at the same time Western renters' migration into Eastern public housing, even if very small, may well pose a real threat to homeowner majority in Germany's East. Put differently, while there is hysteresis in homeownership there is no hysteresis in the homeownership rate. This means that advising a small, seemingly harmless reduction in Eastern public housing rent faces an added difficulty over and above the standard pitfalls of policy reform. Not just need Eastern homeowners to be compensated for, or kept exempt from, the losses foreseeable from public housing deficits arising from lower rent. Eastern homeowners also need to be guaranteed protection against further reductions in rent likely once homeowner majority has eroded.[26] Proposition 4 summarizes.

Proposition 4 (Hysteresis and the Political Economy of Reform):
While there is hysteresis in Eastern homeownership there is no hysteresis in East's homeownership rate. Advising a seemingly harmless small rent reduction in Germany's East has to contend with two fears on the part of Eastern homeowners: (i) having to contribute to the resulting small public housing deficit now (ii) joint with seeing homeowner majority erode (producing even greater public housing deficits later).

5   Conclusions

The paper argues that neither level nor persistence of rent and homeownership rate are accidental. They are features of a political economy equilibrium instead. The paper also argues that no rent reduction is likely to occur in Germany's East. East Germany's risen homeownership rate acts as a ratchet, "petrifying" East's excessive rent. In equilibrium, modernization is intense, homeownership one half, vacant housing vast, and large rent persistent. Further, even a modest proposal of reducing rent

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[25]Immigrants from Germany's West are unlikely to buy a house in Germany's East. This assumption mirrors our earlier assumption that emigrants from Germany's East do not buy a home in Germany's West.

[26]...and may further explain why advising even only modest changes in Eastern rent (Dascher (2005, 2008b)) has produced no response at all.

only slightly must meet fierce resistance by the homeowner majority in place. Home-owners must fear that even a slight rent reduction will result in losing their majority of the Eastern electorate.

A large literature suggests that homeownership makes households internalize many of their neighborhood-related actions.[27] In particular, the belief that "homeowners are better citizens" underlies many countries' housing policies. In suggesting that homeowners in Germany's West may be responsible for excessive rent in East this paper in part sides with the small literature questioning the beneficial role of a high homeownership rate. Oswald (1996, 1999), for instance, argues that more pervasive owner-occupiership may reduce household mobility, and hence be responsible for greater labor market mismatch.

On the technical side, note that our endogenizing δ (in section 3) and $\bar{r}$ (in section 4) in fact amounts to setting up a four stage game. At the first stage Western homeowners pick cost rent. At the second stage Eastern households simultaneously choose whether to leave, and if not, how to live. At the third stage Eastern households simultaneously vote on whether to default on modernization debt. And at the fourth and last stage households in East and West produce, trade and consume. The model's equilibrium set out in Proposition 2 just represents the solution identified through backward induction.[28]

Throughout the paper West Germany's landlords do not benefit from rising rent in East. Yet what if West Germany's landlords also owned homes in East Germany?[29] SAB (2008, 61), monitoring public housing demolition in the East German Bundes-land of Saxony, argues that "many landlords (of private rental housing, neglected in this paper) in Germany's East are in fact absentee, living in Germany's West." Possibly, West Germany's interfering with East Germany's rent may also be driven by a much more direct motive than that of manipulating the homeownership rate.

Finally, note that while this paper's model says nothing about East Germany's labor market, an extension quite possibly could. Larger housing rent may carry over into larger commercial rent. While commercial rent so far plays no role in the controversy over East's failure to catch up (as in e.g., Snower/Merkl (2006) or Uhlig (2006)), com-mercial rent certainly plays a key role in the large literature on regional development (Roback (1982)). From this literature's perspective, excessive rent would place an extra burden on local firms. Demand for, and employment of, East German labor might well be lower than they otherwise could be. Such an extension would address

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[27]For an overview see Glaeser/diPasquale (1999).

[28]Rather than setting up the full model right from the start, this paper has pursued a "slower" approach, introducing additional stages one by one. This may facilitate agreeing with the early results of the paper (sections 2 through 3) without necessarily having to agree with its later results (section 4).

[29]Following Sinn/Sinn (1994), this is plausible (i) given that many houses in Germany's East were left behind by those leaving before the Berlin wall was built, and subsequently reclaimed after reunification, and (ii) given that many West Germans heavily invested into East German property after 1991.

not only housing resources wasted but also macroeconomic benefits foregone.

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