Institut für Wirtschaftsforschung Halle
Halle Institute for Economic Research

What Happened to the East German Housing Market?
– A Historical Perspective on the Role of Public Funding –

Claus Michelsen, Dominik Weiß

December 2009 No. 20

IWH-Diskussionspapiere
IWH-Discussion Papers

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Abstract

The paper analyses the development of the East German housing market after the reunification of the former German Democratic Republic and the Federal Republic of Germany in 1990. We analyse the dynamics of the East German housing market within the framework of the well-known stock-flow model, proposed by DiPasquale and Wheaton. We show that the today observable disequilibrium to a large extend is caused by post-unification housing policy and its strong fiscal incentives to invest into the housing stock. Moreover, in line with the stylized empirical facts, we show that 'hidden reserves' of the housing market were reactivated since the economy of East Germany became market organized. Since initial undersupply was overcome faster than politicians expected, the implemented fiscal stimuli were too strong. In contrast to the widespread opinion that outward migration caused the observable vacancies, this paper shows that not weakness of demand but supply side policies caused the observable disequilibrium.

Keywords: housing market transition, housing subsidies, housing supply, East Germany

JEL Classification: D5; H2; R21; R28; R31

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Zusammenfassung

Das vorliegende Papier analysiert die Entwicklungen auf dem ostdeutschen Wohnimmobilienmarkt seit der deutschen Vereinigung im Jahr 1990. Zur Anwendung kommt dabei das weit verbreitete Modell von DiPasquale und Wheaton (1992). Dabei zeigt die theoretische Analyse in Übereinstimmung mit den empirischen Beobachtungen, dass ein erheblicher Teil des derzeit auftretenden Ungleichgewichts auf dem ostdeutschen Wohnungsmarkt durch die umfängliche Förderpolitik in der Nachwendezeit verursacht wurde. Allerdings können auch große Teile des heutigen Leerstands auf die Wohnungsbaupolitik der DDR zurückgeführt werden. „Stille Reserven“ zur Wendezeit wurden mit dem Wechsel vom plan- zum marktwirtschaftlichen Wirtschaftssystem aktiviert. Der zur Wendezeit bestehende Wohnungsmangel wurde so schneller als von der Politik erwartet überwunden. Entgegen der weitläufigen Meinung, die Leerstände wären in erster Linie durch Abwanderung nach Westdeutschland verursacht worden, kann eine Nachfrageschwäche für den Wohnungsmarkt in Gesamtostdeutschland nicht festgestellt werden. Vielmehr ist festzuhalten, dass die Entwicklungen auf der Angebotsseite zu den beobachtbaren Überhängen auf dem Wohnungsmarkt geführt haben.

Schlagworte: Transformation des Immobilienmarkts, Subventionen für Immobilien, Wohnraumversorgung, Ostdeutschland

JEL-Klassifikation: D5; H2; R21; R28; R31

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1 Introduction

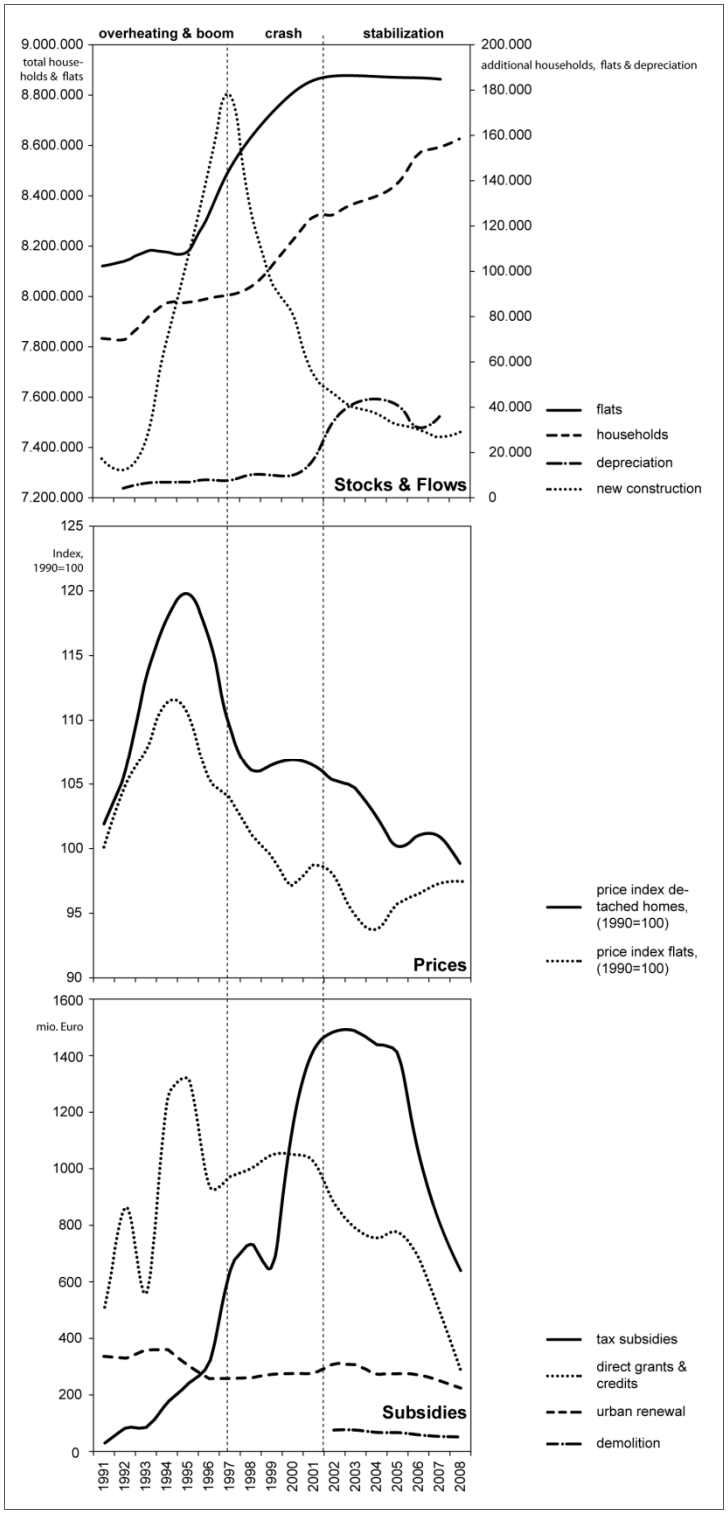
With the reunification of the two German states in 1990, politicians were faced with enormous challenges when combining two economic systems. In the aftermath of the reunification, thousands of residents of the former German Democratic Republic (GDR) migrated to the western part of Germany, in search of employment and economic prosperity.

In order to stop this large-scale emigration, politicians promised a fast process of convergence in standards of living between eastern and western parts of the country. Several instruments were implemented in the early 1990s, especially in the housing and construction sector to enhance the standard of living and to boost private investment. To overcome the scarcity of living space resulting from GDR housing policy numerous subsidies were introduced to stimulate construction of new homes and refurbishment of the existing housing stock. In the early 1990s, a sharp rise in housing-prices and completion of newly constructed homes could be observed. Today, the housing sector in the former socialistic GDR is widely marked by high vacancy rates, on average around 14% and declining real-house-prices. Further, public subsidies for demolition aim to reduce the existing housing stock by 350 000 units by 2010.

Twenty years after the fall of the Iron Curtain, this paper presents a historically motivated review of the post-reunification housing policy, especially with regard to investment incentives. In the paper, we argue that there is a path dependency in housing-policies, which roots in the housing policy of the former socialistic GDR and which strongly influences the spatial equilibrium in today's housing market. Thereby 'path dependencies' are not understood analogous to the term commonly used in evolutionary economics (e.g. North 2000; Wetzel 2005). In a wider sense we argue that once a decision in favor or against a certain housing policy option is made, the attributes of housing (especially durability) lead to processes that are difficult to reverse. We further argue that many decisions made in the early 1990s (caused by urgent problems) were individually rational for politicians but lacked in accuracy, which now cause the observable disequilibrium in the housing market.

Figure 1 presents stylized facts on the dynamics of demand, supply, construction and prices in the East German housing sector. The presented data implies a subdivision of the East German housing market dynamics into three phases. In the early 1990s, the transition of the housing market from a planned to a market-based economy led to booming prices, followed by a sharp raise of construction activities with a time lag of approximately two years. From 1990 to 1993, prices rose about 10-15% on average.

Figure 1:
Dynamics in the East German housing market
- 1991 to 2008 -



Source: BulwienGesa AG, Federal Statistical Office, Federal Ministry of Finance (BMBF), Federal Ministry for Transport, Construction and Urban Renewal (BMVBS); Compilation by the authors.

In this period, demand (number of households) and supply (number of flats) rose only marginally. The early years after reunification can therefore be described as a phase of booming prices.

During the years from 1993 to 1996 construction kept booming while prices started to fall in 1995. This phase is characterized by overshooting construction. Between 1997 and 2001 the construction sector collapsed and prices plummeted to a level below house prices in 1990. This crash was followed by a stabilization of markets since 2001, where construction and prices remained at a low level, while the depreciation has risen.

Figure 1 also suggests a significant political influence reflected in the market activities. Especially tax incentives were offered to a great extent, following construction with a time lag of at least one year. Direct investment grants and credits to real estate developers were also offered on a large scale, having a direct impact on construction and prices.

In order to get a deeper understanding of the mechanics of these subsidies, we employ the four quadrant model (DW-model) proposed by DiPasquale and Wheaton (1992) and show in graphical solutions the direction and general effects of different housing subsidies on the housing stock and prices. Our aim is not to quantify a solution of a general equilibrium model of the housing market; more importantly, we want to present the individual rationality of political decisions at different points in time highlighting the discrepancy between the envisioned short term economic objectives and real long term effects.

Because the variety of housing aid and support programs is enormous, we focus our analysis on housing subsidies and grants offered by the national government, which affect the quantity of housing investment more or less directly. These grants were usually given in form of tax incentives, direct aid to construction costs, low interest loans, urban renewal policy and demolition programs.

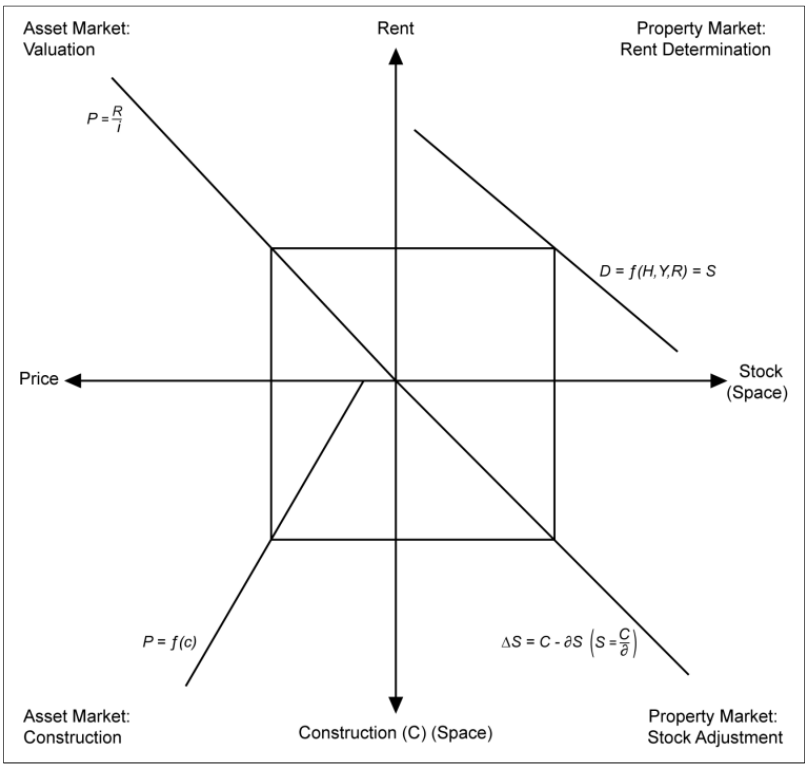
The paper is structured as follows: in the following section, we formulate a simple theoretical model of the real estate market, illustrating the expected effects of housing subsidies. In the third section, we examine the comparative static of several stylized types of subsidies in order to analyze the links between grants and housing market dynamics. Finally, the last section reviews past housing policy under consideration of the general political conditions and consumer needs. Although the reunification of two states with completely different economic systems is a unique historical event, we aim to provide more general findings on the effects of housing policy and subsidization for markets in strong disequilibrium.

2 A Theoretical View on Housing Subsidies

The four-quadrant model proposed by DiPasquale and Wheaton (1992, 1996) offers a generalized version of the commonly used stock-flow models of real estate markets.

The model itself connects the markets for rental housing and the financial markets, where real estate is traded as an asset. Of course, this approach offers a strongly simplified form of a general equilibrium model; rejecting aspects like bargaining, leverage effects, monopoly power of the government in land supply, the political economy of housing supply or strategic interactions between real estate developers (see Leung and Wang 2007). However, for the purpose of comparing the general long run trajectories and short run effects of subsidies on the East German housing market this simplified comparative-static framework is appropriate. For the theoretical analysis, we simply add grants, subsidies and tax reductions to the four quadrants.

Figure 2:
Fundamental Framework of the four-quadrant Model



Source: Compilation by the authors.

The four quadrants are connected through several channels. The rent *(R)* is determined by the short run Stock of Housing *(S)* available and the Demand for Housing *(D)*. Prices *(P)* on the asset market are defined by the rent and the rate of return *(i)* of real estate. The Stock adjustment *(ΔS)* is determined by the amount of new space built and the depreciation rate *(δ)*, where the amount of construction depends on the prices for real estate, coming from the asset market, and the cost function *(f(c))* for new construction *(C)*.

2.1 Subsidies and the Demand for Housing

Rents are determined on the north-east quadrant of the model: the market for property. The total demand for space *(D)* is, generally formulated, a function of disposable income *(Y)*, the number of households *(H)* living in a certain area and rent *(R)*. Public funding and market intervention can affect all these three variables by different policies.

First, rent control is an instrument to ensure affordable housing for households living in a certain region. From a theoretical point of view, the general effect of rent control policies is described as a misallocation of housing and an undersupply in quality and quantity (see Glaeser and Luttmer 2003; Olsen 1988; Albon and Stafford 1990).

Second, public authorities can offer grants directly to households to increase their disposable income. The effect of the supplementary housing assistance is a shift in the demand function, increasing total demand for space and increasing rents (see Leeuw and Ekanem 1971).

Third, programs for urban renewal can upgrade overall attractiveness of cities and regions. Economic theory on migration implies that households maximize their discounted overall utility by choosing the optimal region to live in, considering their individual budget constraints (see de Jong and Fawecett 1981). Utility in this case is defined as the discounted sum of direct and indirect income flows, the flows of utility stemming from general living conditions (e.g. weather, landscape, social networks), housing (e.g. quality and quantity of flats, quality of neighbourhoods) and the provision of local public goods (e.g. education, health care, culture) (see Cheshire and Sheppard 1995; Chay and Greenstone 2005; Hoyt and Rosenthal 1997). Subsidies for urban renewal should therefore lead to migration-surpluses and a shift in the demand curve. Obviously, these surpluses decrease by distance when costs of migration rise respectively. It is therefore very important, which spatial delimitation is used to analyze the effects: the larger the region, the smaller is the measurable demand-effect.

Because there are major problems to isolate the effects of housing assistance from overall income increases and the variety of rent control instruments over regions we concentrate our analysis on urban renewal subsidies. As mentioned above the demand effect of these programs are likewise difficult to measure, we hold demand constant in our analysis. Since the programs contain elements to affect both – supply and demand – we concentrate on the supply side.

2.2 Housing Valuation and Subsidies

The north-west quadrant of the model represents the asset market, where the price for real estate is determined. The price (P) is defined as the ratio of rent (R) and the rate of return from real estate (i). While i is not the nominal rate of return, it is the expected risk adjusted interest rate from real estate. Thus, when expectations for the capitalization rate rise, the price for real estate at a given rent level (R) falls (see Colwell 2002). Since i is

determined exogenously and dependents on numerous factors, such as risk, long run inflation expectations, interest rates on other equity markets (in other words: the rate of return of all other assets), it is difficult to define a general solution.

If we assume that in equilibrium the expected rate of return from real estate should equal long term (risk-free) interest rates (i_{lt}) plus differences in tax treatment (γ) compared to other assets, multiplied by a premium, reflecting general risk (ρ) such as vacancy, we are able to formulate a simple present value equation, defining the price of housing under consideration of policy variables where the numerator defines the net income flow from rents (nominal rents minus tax and operating costs ω) and the operator contains the expected return from real estate.[1]

$$P = \sum_{t=1}^{\infty} \frac{(1-\omega)\cdot R - T}{(1+\rho\cdot(i_{lt}+\gamma))^t} \tag{1}$$

Both, numerator and operator, include policy-variables that may affect the price of housing at given rents. First, taxes (T) on housing incomes can be reduced or increased. For example, a tax reduction would ceteris paribus lead to an increase in real estate prices. A different treatment in tax policy compared to other assets, such as a decrease in the economic life of housing for tax purposes, would lead to a decrease of i and ceteris paribus to an increase in P. Especially for rental housing, this is a powerful instrument to influence investment behaviour (see Colwell 2002).

2.3 Construction and Subsidies

Construction in the DW-model is modeled as a simple linear function ($f(c)$) of the production factors technology, labour, natural resources (e.g. land) and capital, where marginal development costs rise when construction activities increase. In the short run, resources from all other sectors have to be transferred to the construction sector when more housing is developed. Holding everything else constant, this leads to increasing interest rates on the short run credit market, affecting construction costs positively. Additionally, there might appear shortages in land supply since land for construction is controlled by public authorities. This leads to increasing land prices, which add up to the development costs.

From this point of view, politicians can affect total construction directly via grants for housing developers, such as subsidies for energy efficient construction, housing for low income households or the conservation of historical buildings. A second option is zon-

1 A more detailed view on the impact of tax policy, especially the discounted value of depreciation deduction for tax purposes is presented in *Dipasquale and Wheaton* (1996), pp. 206-211. It is shown that tax policy has great impact on the present value of housing and the time home owners hold their investment. The authors found that the US Tax Reform Act in 1986 raised capital cost for housing investors by 3% due to new marginal tax rates and 1% due to an increase in the economic life of a building from 15-19 years to on average 27,5 years (see *DiPasquale* 1999).

ing policy; local authorities can control urban development by freehanded or strict zoning (e.g. by the provision of land, laws on housing size or standards of construction (see Fischel 2008)). Third, mortgage interest reduction can stimulate construction activities, as they enter the cost function for housing developers directly. All three options (freehanded zoning) shift the cost curve to the right (see DiPasquale and Wheaton 1996).

2.4 Stock Adjustment

The change in total housing stock is determined in the south-east quadrant of the model. How quickly the housing stock derives its new equilibrium depends on additionally constructed space (the flow of new construction) and the rate of physical depreciation. In equilibrium, construction equals depreciation. It is important to point out that the financial depreciation of the housing-stock related to the investment cost and the real physical depreciation of buildings are regularly not congruent. The natural depreciation rate is quite constant over time and very low due to the durability of housing. The depreciation rates related to taxes and consumer attitudes are not considered in this partial equilibrium.[2]

In general, the physical rate of depreciation is determined exogenously by the natural rate of deterioration that depends on materials used in construction, construction technology, the type of building, housing standards and environmental factors. Additionally, the intensity of usage and maintenance efforts might affect physical depreciation. In this context, ownership structures play an important role: from a theoretical point of view, homeowners tend to be more careful and tend to put more effort in maintenance than tenants or owners of rental housing do (see Sweeney 1974).

However, the physical rate of depreciation is also influenced by the political context. For example, housing policy in the former GDR between 1976 and 1990 pursued the goal to reduce housing scarcity by developing industrial produced apartment buildings. Resources for maintenance and refurbishment of old buildings were used to produce new buildings, hazarding the consequences of a much faster deterioration of older buildings. Today, due to high vacancy rates and considerable declines in house prices, the government offers subsidies for demolitions to homeowners in East Germany. Both policies affect the physical depreciation rate with the difference that nowadays demolition of housing is an alternative for homeowners when the subsidy exceeds the net present value of space. In the GDR, however, there were simply no resources available for the maintenance of the housing stock.

2 Nevertheless, consumer attitudes can affect the valuation of buildings significantly. The price of certain types of housing increases or decreases with shifts in (long-run) consumer preferences, even though the physical deterioration is zero (see *Knight* 1996). Because we assume a single homogenous commodity, we can neglect these aspects.

3 Analyzing the Dynamics of the East-German Housing Market

In this section we evaluate the dynamics of the East German housing market after reunification in 1990 (see Figure 1). We present a historical review of the housing policy and its effects, embedded in the theoretical framework developed in the prior section.

As already indicated above, the housing sector in Germany is highly subsidized. Especially after 1990, public expenditures for housing have more than doubled within 5 years. Nearly one of four Euros of all subsidies of the German federal government was spent for on housing and its related markets in the year 2005 (see BMF 2007). For the East German housing market, subsidies offered by the federal government summed up to 34 789 Billion Euros between 1990 and 2008 (see Table 1).The provision of these subsidies is mostly connected to §72 Abs. 2 GG of the constitution for the federal Republic of Germany that is based on the idea of equalizing differences in the general conditions of living between regions.

Table 1:
Housing Subsidies for East Germany since 1990
- Grants and subsidies offered by the federal government in billion Euros -

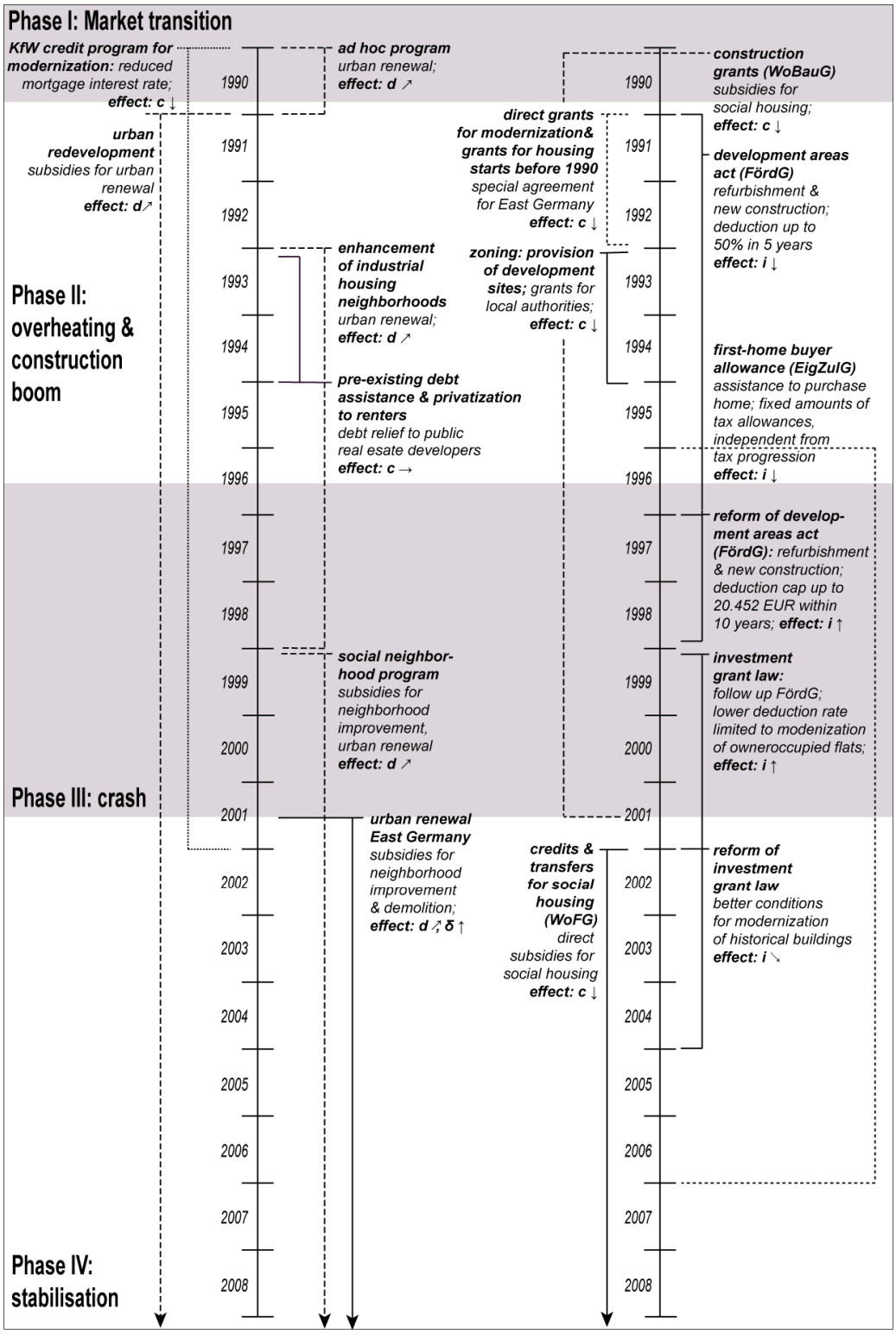
Types of Subsidies	Amount
tax subsidies	13.881
direct grants and credits	15.218
demolition	0.458
urban renewal	5.231
total	34.789

Source: BMF 1999, BMF 2007, compilation and calculations by the authors.

In our analysis we only consider those grants that are clearly distinguishable between East and West Germany. Furthermore, we mainly focus on fiscal measures that support housing developers. Of course there are numerous transfers to low income households, but these subsidies are strongly embedded in the social transfer system and hardly to distinguish. Besides, there are numerous other programs on the national, state and local level, which, for the same reasons, cannot be captured in our analysis. Nevertheless, we include a large proportion of all subsidies affecting the supply side of the East German housing market and urban renewal grants, which affect both, supply and demand.

In order to describe the effects of subsidization after 1990 in East Germany we use information from the subsidy-reports of the federal German government (see Federal Ministry of Finance (BMF) 1991 and the subsequent reports published every two years). These reports contain data on tax- subsidies, the amount of direct subsidies to real estate developers, the financial aid to credit rates and several other programs, like debt relief for public housing co-ops.

Figure 3:
History of housing subsidies in East Germany since 1990



Source: Compilation by the authors.

The data used for our analysis reach back to the 13th subsidy report that starts with the years 1989 and 1990. This was the period of political change what allows us to trace back the impact of the reunification and the following transition process in East Germany. There are of course some inconsistencies between reports, since some allowances are considered as a subsidy in a later report but were not counted before (BMF 2007, p. 15). However, in general, this problem appears to be very small (see Boss and Rosenschon 2008). But in the special case of housing related grants the practice of the subsidy reports disregarded urban renewal subsidies until 2003 and we therefore added information on the amount of subsidies for urban renewal and demolition conducted from several other official sources. Figure 3 presents a time bar, summarizing the relevant fiscal policy approaches for East Germany.

3.1 Real Estate Markets in Transition

In order to gain a deeper understanding of the dynamics observed in figure 1, we apply the four quadrant model of DiPasquale and Wheaton (1992, 1996). In this first subsection, we analyze the situation at reunification when housing supply in the former GDR became market organized.

Market Conditions

In 1990, housing markets in East Germany were widely marked by shortages in supply and poor quality of the dwellings, although the housing policy of the former GDR followed a reflationary approach. In 1972 a large real estate development program was launched to build 3 million flats to overcome housing shortage which existed since the early 1950s. In fact, 1.9 million flats were constructed until 1990, mostly in simple prefabricated slab-construction apartment houses. Nevertheless, in 1989 more than 780 000 requests for new flats revealed that especially the quality of the existing housing stock did not fulfill consumer needs (see Hunger and Bock 1990; Bartholmai and Melzer 1993). Actually, the bare number of housing in the former GDR appeared to be more than sufficient. Following the official statistics, about 400 000 flats were vacant, which met approximately 5% of the total dwelling stock (see Pfeiffer et al. 2000).

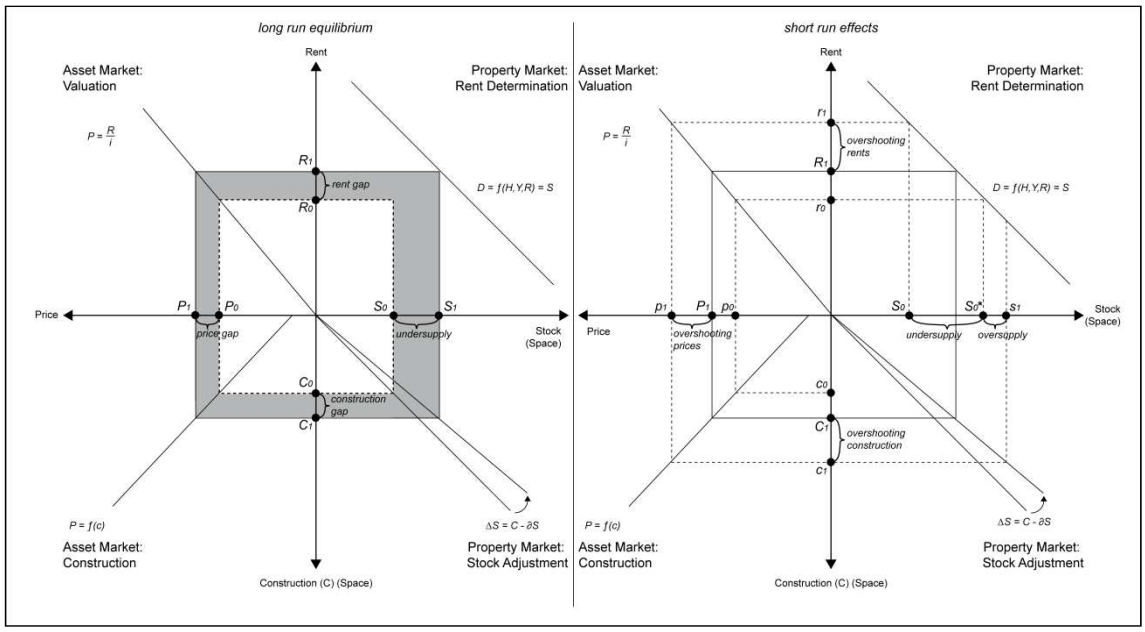
Policy

An explanation for this two-sided result is the GDR housing policy. Besides massive programs for construction, the maintenance of historical domestic buildings was widely disregarded because the costs for new construction undercut costs for maintenance. Furthermore, ideological aspects led to political preferences for the development of new ‘socialistic cities’ (see Federal Ministry of Regional Planning, Building and Urban Development (BMBau) 1994). The population also favored new flats mainly because they were affordable (public rent-controlled) and modernly equipped compared to older dwellings. In sum, this policy led to a remarkable ‘hidden reserve’ in the housing market, especially in inner-city neighborhoods with historical buildings.

Comparative statics

Figure 4 shows the situation in 1990 according to the theoretical framework. The dotted rectangle represents the situation in the GDR, where rent-control and construction policy led to an undersupply in housing. With the reunification, the housing stock became privatized and markets for real estate were established. Privatization led to a decrease of the housing depreciation rate (solely due to the fact that property offers the option to use dwelling commercially instead of a planned deterioration) and therefore to a shift in the stock adjustment curve. The new long run equilibrium is marked by the solid rectangle.

Figure 4:
Long run equilibrium and short run effects after reunification
- 1990 -



Source: Compilation by the authors.

In the long run, the change of the market regime leads to increasing rents, prices, construction and also growth of the total housing stock. Because markets were in disequilibrium in 1990, the short run effects differ strongly from the long run situation.

In the short run, undersupply leads to overshooting rents (r_1), indicating higher prices (p_1) and overshooting construction (c_1). The lower rate of depreciation, due to the change in the market regime, has no short run effect on prices and rents but leads to a larger housing stock at given levels of construction. On the other hand, the short run demand on rent-controlled markets exceeds regularly the long run demand when rent-control is abolished. Therefore short run undersupply is larger than long run undersupply ($(S_0^* - S_0) > (S_1 - S_0)$). Another finding is that the transition to a new economic system caused excess supply in the short run ($s_1 - S_0^* > 0$). Although excess supply is a standard market reaction following an external shock in a typical real-estate cycle the

extent and persistence depends on the strength of the shock and the market conditions, particularly the elasticity of supply which is determined on the asset market.[3]

Empirical findings

For the early years after reunification housing prices were rising. In 1993 prices for detached homes reached a level approximately 13% above the 1990 prices and prices for flats has risen by nearly 8%. In contrast, construction completions remained on a relatively low level until 1993. Taking into account that construction completions follow housing starts with a time lag of at least 12 month, the construction boom observable in the following years had already begun in 1992. Inhibiting factors for investment in the early 1990s were the scarcity of development sites and unknown legal relationships concerning property. Especially for the existing housing stock this became a serious problem (Donges et al. 1990).

3.2 Boom and Overshooting after Reunification

Market Conditions

For politicians, the general economic situation and the condition of the housing stock in 1990 led to two main challenges Firstly, the apprehension of an ongoing emigration of the East German population to the western part of the country was present. In the years 1989 to 1991 more than one million citizens of the former GDR emigrated to the western part of Germany (see Kubis and Schneider 2008). Politicians feared an irreversible 'bleeding' of Eastern Germany. Therefore, the government promised a fast process of convergence, confirmed by the still present term of 'blühende Landschaften' (flourishing landscapes). This aphorism was introduced by the former chancellor Helmut Kohl in 1990, when he held a televised speech to introduce the German Mark in the area of the former GDR. Secondly, not only the housing market was in bad shape but the whole Eastern German economy was in a disastrous condition and not competitive on world markets. The existing capital stock was almost completely depreciated (in a physical sense) and private equity practically not available (see Blum 2007). Direct public transfers were by far not enough to solve these problems. Thus, to restart production and to upgrade living conditions, as well as the condition and supply of the housing stock, private investments needed to be encouraged.

Policy

In order to stimulate economic activity and housing investment, several instruments were implemented in the early 1990s. First, ad hoc programs for urban renewal were introduced to lower urgent urban development problems and to strengthen demand. These programs offered grants for municipalities. One example is a program to upgrade the

3 There exists a rich strand of literature on housing cycles. For example, *Wheaton* (1999) points out that the cyclical behavior of real estate markets depends, besides some irrationality of agents, crucially on the characteristics of markets, especially supply and demand elasticity.

situation of GDR housing development sites (enhancement of industrial housing neighborhoods). It was launched in 1993 after an experimental project in 1992 and faded out in the late 1990s. It was a reaction on the discussion about the future of the big housing development areas, the so called 'Plattenbau' (prefabricated slab-construction apartment houses) that had been built during the 1970s and 1980s in nearly all medium and large cities in East Germany. It was mainly focused on public space improvement and the development of local public infrastructure. Modernization of flats or other private construction projects like retail centers were not directly supported (Rietdorf et al. 1996). Additionally, the general program 'urban redevelopment' was extended to the East German housing market. The range of projects, eligible for grants is wide, covering expenditures for projects around road infrastructure, public space improvement, public utilities and land preparation. About 25% of the federal transfers were used for residential environment development and public space improvement (BMVBS 2004, 99). Between 1990 and 2004, about 50 000 buildings and about 150 000 flats were newly constructed or refurbished within this urban renewal program (BMVBS 2004). To account for the large share of historical building in East Germany a sub-program to preserve the historic heritage of architecture was founded. About 25% of the grants within this program were spent for official facilities (e.g. town halls), which are often situated in historical districts (BMVBS 2004). Although both programs were hybrids between direct improvement of dwellings and indirect neighborhood quality enhancement, they were growth orientated and construction related investment measures.

Secondly, programs for social housing offered grants and credits for the construction of new dwellings. Two subsidies were especially designed for the East German housing market in the early 1990s. The first one offered direct investment grants to stimulate the modernization of housing and to develop new flats (WoBauG). The second program supported the completion of construction started before reunification and which suffered from financing problems caused by the currency reform. Additionally, credits and credit aid were offered for modernization and new construction (KfW Wohnraummodernisierung). Further, grants for municipalities to develop new housing sites intended to lower land scarcities (zoning). Overall, these instruments were designed to overcome housing shortages by reducing the costs of housing development and to stabilize cost of living.

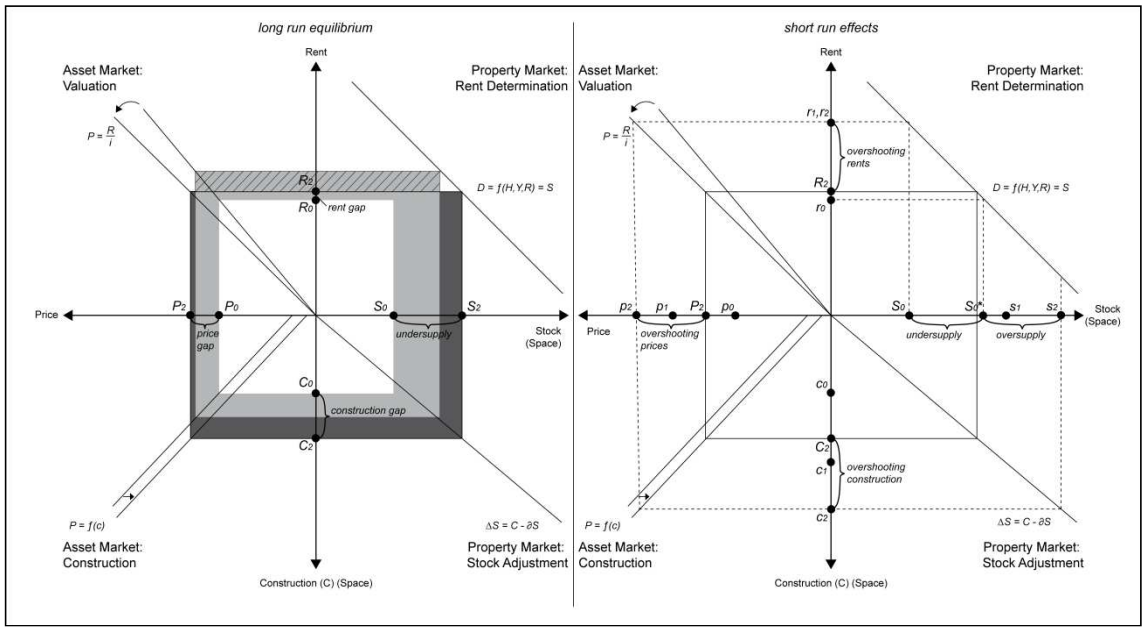
Thirdly, the 'Development Areas Act' (FördG) offered high tax deductions to attract private debt capital for new construction and the refurbishment of the existing housing stock. Between 1991 and 1997, housing developers were allowed to deduce 50% of their investment within five years. The 'Development Areas Act' supported both, renovation and new construction of housing. In sum this led to higher investments in rented flats rather than owner occupied housing. Due to the tax progression effect, the incentive to invest was much stronger for households with high tax rates. The induced outcome was a notable stream of West German private capital into the East German housing market. Banks, developers and investment consultants issued closed end investment

companies, which in many cases were designed just for exploiting the tax effect. This instrument allowed for higher income streams stemming from real estate and therefore to a reduction of the capitalization rate of housing (i).

Comparative statics

According to the model, these policy approaches lead to several changes compared to Figure 4. Direct grants and credits lower construction costs and shifted the construction cost curve to the right. In the model, a counterclockwise rotation of the capitalization rate, determined in the north-west quadrant, can be seen as the result of tax incentives for real estate developers. In the long run, this policy is likely to have a stabilizing impact on rents (R_2), which are below the long run equilibrium derived from Figure 4. Furthermore, only small impact on prices can be assumed. Nevertheless, long run house prices should rise to P_2. At given demand, this leads in sum to a larger housing stock (S_2) and higher construction activities (C_2). Compared to the situation derived from Figure 4 the supply and construction gap increased.

Figure 5:
Short run policy effects, boom and long run equilibrium in the early 1990s
- 1990 to 1996 -



Source: Compilation by the authors.

In the short run, rents are unaffected by this policy, since they are determined by actual demand and supply. In contrast, the change in the capitalization rate is predicted to lead to overshooting prices compared to the long run equilibrium and to higher short run prices compared to the situation derived from Figure 4 ($p_2 > p_1 > P_2$). Additionally to the price effect, lower development costs support construction and boost market overshooting. Potential oversupply rises from $s_1 - S_0^*$ to $s_2 - S_0^*$. To summaries, the imple-

mented instruments strengthened the demand shock stemming from the system transformation and therefore increased the amplitude of the real estate cycle.

Empirical findings

The observed dynamics fit with the short run results of the theoretical analysis. Prices continued to rise until 1995, when the index for detached homes reached a level of nearly 20% above the 1990 level. Prices for flats already peaked in 1994 at a level of approximately 13% above 1990 average (see Figure 1).

As predicted by the comparative static model, housing completions started to rise sharply in 1993 and peaked in 1997. Within four years, 621 560 new dwellings were constructed in the former GDR, which is equal to 54% of all new construction since 1990 and a raise in total supply by 5.5% since 1993. Moreover, refurbishment of old housing led to an increase of the stock by approximately 85 000 flats (see Pfeiffer et al. 2000). Over the same period, demand only rose by 64 000 households. From 1993 to 1998, the average vacancy rate more than doubled from 6.2% to roughly 13.2% of total housing in East Germany (see Dohse et al. 2002).

Not surprisingly this reflationary housing policy has not failed in its purpose. Although it is not possible to calculate the exact value of the instruments implemented between 1990 and 1996 to strengthen construction activities, one can suspect their extent. Especially the amount of tax subsidies increased sharply. Since tax subsidies can be measured with a time-lag of at least one year after building completion, construction activities again occurred in tax deficits, which started to rise sharply in 1996. A direct impact on construction activity can be assumed grants and credits for construction that peaked in 1996 (see Figure 1).

The period is therefore characterized by sharply rising prices until 1995, followed by an overshooting construction sector which was supported by a wide range of subsidies. According to the model, boom and overshooting of real estate markets can be explained by transition dynamics and additionally by housing policy incentives.

3.3 Crash

Market Conditions

The situation after 1997 was dramatically different compared to 1990. Instead of undersupply, high vacancy rates could be observed all over East Germany. Overall, about one million flats were vacant in the year 2000 (see Pfeiffer et al. 2000). Prices already started to decline in 1995 and the construction activity fell dramatically between 1997 and 2001. Politicians did not anticipate these trends since all previous incentives were set to overcome persistent undersupply in East Germany. The responsible ministry for spatial planning and housing stated in the end of 1994:

> 'The perspectives, especially for large housing development sites are positive […] due to favorable terms on housing markets. […] Demolition of these flats is no alternative!' (see Federal Ministry of Regional Planning, Building and Urban Development (BMBau) 1994).

Policy

However, politicians reacted reluctant to the observable trends. In this time, the political discussion was focused on balancing social aspects of the housing policy. Especially tax incentives were criticized due to the fact that they were more attractive for high-income households and professional real estate developers. Therefore, in 1996 the first-home buyer allowance was changed, offering fixed tax deductions independent from income. This especially encouraged investment of low- and middle-income households (Kornemann 2000). The 'First- Home Buyer Allowance' (until 1996 § 10e EStG, later EigZulG) stands in a long tradition of Germanys housing policy and promoted for the area of the former GDR owner occupied housing development. This instrument was the basis of home ownership support in the 1990s, having no regional limitation. According to the work of Färber (2003), we assume that the relevant share for East Germany of total 'First- Home Buyer Allowance' is approximately 23% and amounts in a total of 8.7 billion Euros.

In 1997, deductions of the development areas act to real estate developers were cut to 20 000 Euro, still supporting modernization and new construction. Since 1999, these deductions were exclusively dedicated to the modernization of flats and new construction in inner-city neighborhoods. The new instrument, the so called 'investment grant act' (InvZulG), consisted of tax-free grants that are limited to a certain share of the investment cost. The new regulation was strongly focused on inner city areas and the renovation of historic buildings. These grants summed up to 2.7 billion Euros.

Additionally, a program for urban renewal in socially underprivileged neighborhoods was launched to oppose ongoing trends of segregation. In 1999, the 'Social Neighborhood program' was founded, which is still operating and trying to improve living conditions in socially distressed areas, mainly by encouraging cooperation between different actors in the neighborhood. The focus of this program has clearly shifted away from construction to networking between citizens and public and private stakeholders.

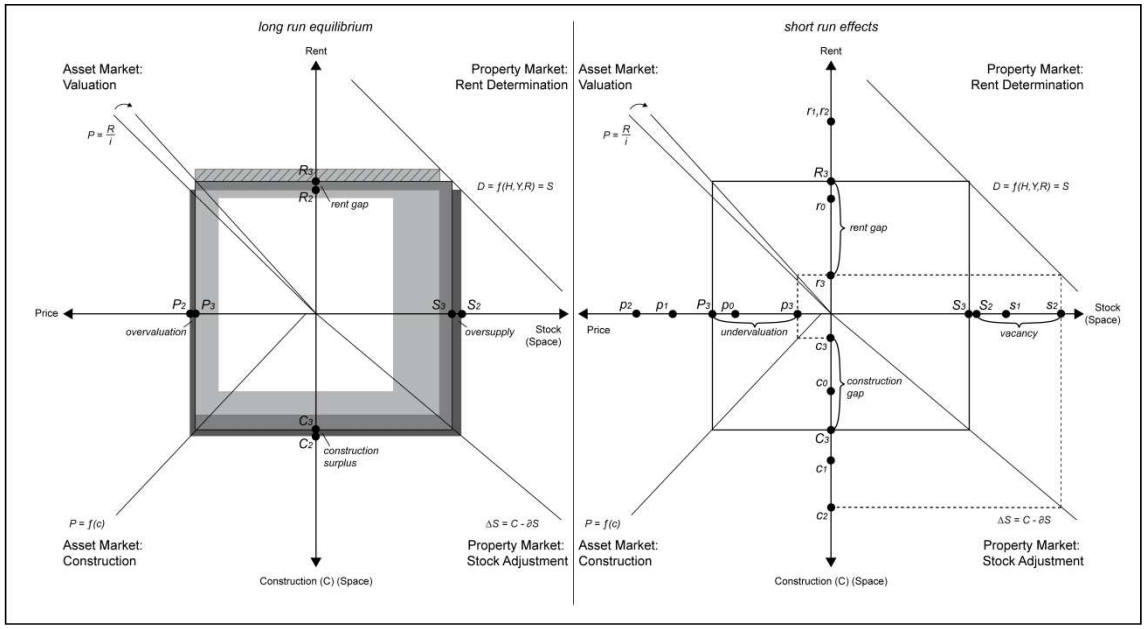
In sum, politician's reaction to high levels of vacancy and the crash of housing prices was retentive. Incentives were only cut marginally and politicians rather tried to solve the occurring problems by implementing additional urban renewal programs. On the contrary, the reform of the first-home-buyer allowance set additional incentives for urban sprawl.

Comparative statics

According to the model, the changes in housing policy lead to a clockwise rotation of the capitalization rate. Compared to the situation derived from Figure 5, the new long

run equilibrium is marked by lower prices (P_3) and higher rents (R_3), leading to lower construction (C_3) and a smaller total housing stock (S_3).

Figure 6:
Short run policy effects, crash and long run equilibrium in the late 1990s
- 1997 to 2001 -



Source: Compilation by the authors.

Assuming that markets overshot to s_2 in the previous period, vacancy is defined as $s_2 - S_2$. The short run effects of this disequilibrium lead to sharply decreasing prices and rents. Rents can be seen falling from r_2 to r_3 and prices from p_2 to p_3, both below the level at reunification (p_0, r_0). Next construction (c_3) decreases significantly below the long run equilibrium level (C_3). The gap between short run construction ($c_2 - c_3$) can be understood as the speed of convergence to the new long run equilibrium. The larger the gap, the faster the new equilibrium is achieved.

Another finding of Figure 6 is that short run policy effects are comparably small to the induced effects from vacancy. At low rent levels, the total leverage of a change in housing policy is smaller, implying that politicians can stimulate construction in tight markets much easier than affecting broad markets to consolidate.

Empirical findings

The dynamics of this phase are well considered in the stylized model. As shown in Figure 4 and 5, transition dynamics and construction incentives brought the danger of massively overshooting markets. Indeed, vacancy rose remarkably since in the mid 1990s. Figure 6 depicts that this should lead to a collapse in prices and construction, as observed in the mid to late 1990s. In the period between 1996 and 2001, the construction

sector finally collapsed. While in 1997, the construction of approximately 180 000 new dwellings was completed, the building completion fell to 45 000 in 2001 (see Figure 1).

Although total demand continuously rose throughout the 1990s, prices started to fall dramatically in 1994/1995 and in 1999 prices for flats were below their 1990 level. Further, prices for detached homes fell to the level of the year 1992. Since there is no time series for rents we cannot verify if paid rents actually fell within this period. Normally rents are relatively stable over time since rent restriction act does not allow for initial adjustment. Nevertheless, vacancy reduces the probability for landlords to rent out their real estate. Therefore, even at stable nominal rents the discounted present value of the income stream stemming from real estate should be lower.

The amount of housing subsidies was still relatively high – direct grants and credits were offered in an extent of approximately one billion Euros per year between 1996 and 2001. The delayed effects of tax-incentives lead to sharply increasing annually tax-losses, peaking at approximately 1.5 billion Euros in 2001.

Stabilization

Market Conditions

For politicians, the new situation was by far more difficult to handle than the original undersupply. Durability as the primary characterizing attribute of housing, leads in cases of oversupply to a persistent crises of real estate markets, especially when housing demand stagnates or increases only slightly (see Glaeser and Gyourko 2005). For investors, demolition of housing would in many cases lead to a total loss of capital, making a market exit unfeasible. Further, the crash of real estate prices may cause spatial lock-ins for owners, because the amount of credits can exceed the prices for housing. In this case, investment in modernization or maintenance can suffer (see Chan 2001). In addition, several problems of the early 1990s were still present. The construction boom headed by real estate developers led to high investment in the outskirts of the East German cities and therefore to significant tendencies of urban sprawl. Since it was easier and faster to construct new dwellings than to rebuild the historical inner-city housing stock, especially architectural monuments were still in bad shape (see Herfert 1997, Herfert and Ahring 2001, Herfert 2002).

Policy

In 2000 a commission of experts was assigned to develop strategies to handle the new situation and to stabilize markets Overall, the commission recommended a program for demolition of 350 000 flats and a change in housing policy to a global reduction of investment incentives. Particularly a concentration of grants to owner-occupied housing and the refurbishment of inner-city neighborhoods were suggested (see Pfeiffer et al. 2000). In 2001, a special program (urban renewal East Germany) for the East German housing market was introduced, which generally offers 60 Euros for the destruction of

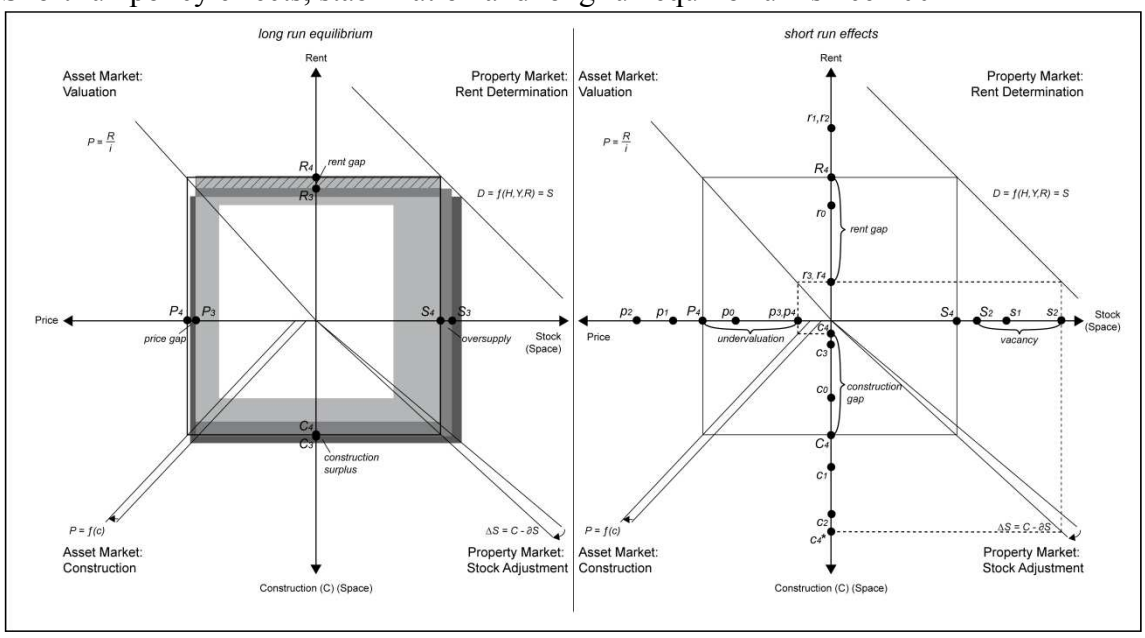
every square meter housing space. The grants are offered for cities, which have a distinct concept for urban redevelopment. About 50% of the total grants offered in this program are dedicated to demolition. With the expectation of a shrinking population and declining demand, the housing stock should be adjusted by the public-funded demolition of dwellings. Nearly all medium and large cities in East Germany are using the program to reduce space of living. The demolition subsidy is the only active policy affecting the physical rate of depreciation (δ), since changes of construction standards nor ownership and occupation structures (see Section 2.4) seem to be inappropriate to reduce the dwelling stock.

In 2001 the investment grant law was reformed in favor of the modernization of historical buildings. This incentive was completely abolished in 2004. In fact, investment incentives were only slightly reduced. Especially the first-home buyer allowance still existed until the end of 2006. Policy focused on an urban renewal program for demolition and the upgrade of inner-city neighborhoods and the reduction of direct grants and credits for construction (1.4 billion Euros).

Comparative statics

Applying these policy approaches to the model, a clockwise rotation of the stock adjustment function and a shift in the construction function to the right result. In the long run, the housing stock (S_4) and construction (C_4) declines, while rents (R_4) and prices (P_4) rise, compared to the long run equilibrium derived from Figure 6.

Figure 8:
Short run policy effects, stabilization and long run equilibrium since 2001



Source: Compilation by the authors.

In the short run, at given rents (equal to the situation before, $r_3=r_4$), prices are stable ($p_4=p_3$) while construction should fall ($c_4<c_3$) due to higher development costs. Higher depreciation leads to a larger gap between actual construction (c_4) and construction needed (c_4*) to preserve the amount of the existing housing stock (s_2). Ceteris paribus, the stock adjustment should be faster ($(c_4^* - c_4) > (c_2 - c_3)$).

Empirical findings

As predicted by the model, the data showed that markets did in fact stabilized since 2001 (see Figure 1). Construction still remains on a very low level, leaving the total housing stock in 2008 nearly unchanged compared to the year 2001. With the introduction of the program for demolition, the rate of depreciation initially raised from approximately 0.1 % in 1995 to 0.5 % in 2004. Between 2001 and 2007, the housing stock declined by 7 706 flats in total, while demand increased by roughly 300 000 households. In sum, this caused slightly falling vacancy rates and stabilized prices and rents.

Further, the analysis shows that the decline of prices for flats slowed down. Prices found their minimum in 2004 at a level of approximately 94% of the prices in the year 1990. Since 2004, prices began to rise slightly. Prices for detached homes, on the other hand, show a persistent negative trend. In 2008, they fell below the level of 1990. This is not surprising, because housing policy is mainly focused on larger cities and the reduction of the multifamily-housing stock. Additionally, the first-home buyer allowance (EigZulG) faded out in 2006.

Since 2001, the actual amount of tax subsidies and direct investment grants declined sharply (see Figure 1). Obviously, this is connected to the change in housing policy, focusing on urban renewal, the reduction of vacancy and the refurbishment of the existing housing stock.

4 Concluding Remarks

Our study reviewed the German housing policy since reunification, applying the theoretical framework proposed by DiPasquale and Wheaton (1992, 1996). In our analysis, we focused on policy approaches that were designed to affect the supply side of housing markets. Stylized facts show that housing markets in East Germany are still in disequilibrium. At reunification, housing supply was marked by scarcities. Today, real estate investors and politicians are faced with remarkable vacancies. In the meantime markets for housing were characterized by high volatility. A sharp rise in prices in the early 1990s was followed by overshooting construction. Dramatically falling prices in the mid-1990s caused a crash of the construction sector. These dynamics were attended by numerous policy interventions which tried to solve the occurring problems. In retrospec-

tive, the initial situation in 1990 and the global investment incentives in the early years after reunification created a path of housing policy.

In our theoretical analysis, we showed that the transition from a planned to a market based constitution of housing markets implied sharply rising prices and rents followed by significant construction activity. This can be interpreted as a result of the GDR-housing policy which created scarcities in housing markets, induced by rent control and an unsustainable construction policy. To overcome scarcity and to enhance conditions of living at affordable costs, politicians implemented incentives to invest into real estate. Since the income of East German households did not allow for high spending after reunification, it was rational to stimulate foreign investment especially for refurbishment and in parts for the new construction of multifamily housing.

Although we did not apply econometric methods to exactly quantify the effects, our theoretical analysis and findings in the literature strongly suggest a significant effect of tax-subsidies and direct grants to the construction boom and the overshooting of the markets (see e.g. DiPasquale 1999; Follain et al. 1993). Further, tax-incentives were designed to support both – new construction and refurbishment, while refurbishment was the main political goal. In this context, the problem of property rights occurred; at reunification, private housing property was the exception rather than the rule. After reunification, the old owners of disposed housing were able to retrieve their former property. In many cases, the new ownership structure was complex, prohibiting fast refurbishment of dwellings or the sale. Moreover, rebuilding of historical housing was much more costly and complicated than to develop new flats. These and other aspects may have led to higher investment in the outskirts of East German cities and the expansion of the housing stock.

From the historical and the theoretical point of view, the arising vacancy rates in the mid 1990s were therefore in part the result of political incentives. In fact, politicians added global incentives to invest into a naturally booming market in the early 1990s and misjudged the induced effects. Comparing the bare numbers of supply and demand in 1990, the existing housing stock was sufficient to accommodate all households in the area of the former GDR but the disastrous quality and a large number of uninhabitable dwellings led the stock effectively appear smaller. Anyhow, a concentration of the housing policy on the refurbishment of the existing housing stock or new construction in the city centres would have led to smaller vacancy.

When policymakers realised the erroneous trend in the mid-1990s they seemed to be astonished and reacted reluctant, changing investment incentives only gradually. A profound change was initiated in 2000, when subsidies for demolition were introduced that stabilized the markets and stopped the growth of the housing stock. Following the literature on urban decline and taking into account that prognoses foresee a decline of housing demand, the observable disequilibrium will still exist in the medium-term future.

As mentioned in the introduction, politicians followed a somewhat logical but fateful path of housing policy. Firstly GDR housing policy created ‘sleeping’ vacancies and a hidden reserve on the housing market. Secondly incentives to invest stimulated new construction. Considering the overall situation at reunification, generous tax-subsidies and housing grants seemed to be a reasonable alternative. The mistakes of these incentives were the spatial inaccuracy (investment in the outskirts) and an approach which appears to be ‘too global’, leading to a high proportion of investments in new construction. As housing is a durable good, the results are long-lasting. The currently observable policy to stabilize the markets is a logical reaction on the earlier developments.

Although the German reunification is a unique historical event, the results of this paper can be generalized for other transforming areas. It is especially the durability of housing that should lead to a carefully use of investment incentives. Once, excess supply is created in a large extend, it is difficult to reverse the occurring trends. A reallocation or a selling of capital is practically impossible because real estate is spatially bounded. In sum, this can be a barrier for regional economic growth and urban development.

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