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# Regulation and Reference Prices in Real Estate Markets

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**ABSTRACT**

This paper analyzes rent regulation and its effect on expectation formation of market participants in the context of uncertainty about finding trading partners. Based on a Walrasian reference, uncertainty and a search market are described in order to analyze the contribution of intermediaries to market equilibrium. It is shown, that the existence of an intermediary can be welfare improving, since he reduces transaction cost. When rent controls are introduced below the equilibrium price level, not only market prices fall, excess demand emerges and intermediaries may expect lower compensation for their service. It is also found that intermediaries' welfare contribution proportionally shrinks with the distance of regulated to unregulated price levels. Moreover, unserved demand may distort other partial markets as well and affect the production potential of the economy.

JEL-Classification: R31, R38, D4.

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**KEYWORDS**: ***Rent regulation, rent control, housing markets, market rents, reference price.***

## 1. Introduction

Whenever markets fail, or public view believes them to do so, state intervention is a regular consequence. In particular, rental rates in the housing market are one target of regulation, since they concern the majority of the population; at least in countries as Germany or Switzerland. It is no surprise to find 95% of the rents beeing regulated in the Netherlands (Priemus (2006))as it sounds tempting to guarantee renters price levels below a free market equilibrium. To the contrast, Jenkins (2009), among others, reviews the literature on rent regulation and draws a rather negative conclusion of price ceilings in the housing market, which is supported by Alston et al. (1992).Based on a survey, the authors conclude that only about 7% of all economic researchers expect positive effects for quantity and quality in housing markets under rent control.

From the perspective of microeconomic market theory, the consequences of price ceilings are fairly analyzed. Clearly, price caps are expected to be beneficial to all market participants with high ability and willingness to pay. However, it restricts supply at a lower level complemented by more market participants at the lower end of the demand function. Excess demand is the usual prognosis of microeconomic theory and potentially black markets emerge due to the competition on the demand side of the market.

But, the housing market differs from microeconomic theory due to object heterogeneity and lock-in effects. Revising a transaction in the housing market goes along with financial expenditures and search cost for a new location, and is therefore more expensive as buying a different type of milk and apples. One focus of the literature on market microstructure based on Glosten and Milgrom
(1985) and Kyle (1985) is the uncertainty of finding trading partners. As this uncertainty



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directly corresponds to search efforts, one aim of this paper is to analyze, whether the propositions of general equilibrium with price ceilings hold true within the search market. Here, rental regulation will show up as long as it affects the search effort market participants observe. Moreover, the role of intermediaries is analyzed due to the fact that they play a pivotal role in the housing market.

To this extent, the paper contributes to the analysis of rent controls as in Jenkins
(2009), Haffner et al. (2008), Priemus (2006), Block (2002), Lind (2001), or
Arnott (1988), who conclude for negative effects of rent control on a general social or economic level. Due to the heterogeneity of real estate and the absence of mobility, regional interactions and spill-overs from one partial market to the next as pointed out by Arnott (1988) are also addressed in the paper, helping to underpin inter temporal and qualitative reactions to rent controls as discussed in Smith (1988).

Furthermore, a more specific strand of microstructure literature is addressed, concerning the role of individual price expectation formation. A very popular means of state intervention is some kind of reference price, for example in the form of quality scores in the Netherlands (Priemus (2006)) as well as nominal price caps as formerly applied in Spain or price evolutions oriented to real indicators as interest rates (Switzerland) or the evolution of reference level real estate (Germany).One assumption of this paper is, that any form of state intervention affects the expectation formation of market participants. To this extent, the second aim of the paper is to link the literature on real estate regulation to the microstructure theory on reference prices as addressed by Gneezy et al.
(2014), Fabrizi et al. (2012), Eichenbaum et al. (2008), or Urbany et al. (1988).

As a basis for the analysis, a simple market microstructure model is formulated in the following section. The so called Walrasian optimum serves as a reference for welfare comparisons. After introducing uncertainty about finding trading partners (chapter 3), the so called search market helps to understand welfare destruction due to individual search efforts. Within the context of the model, it can be shown that even the introduction of a monopolistic intermediary may be marginally welfare improving (chapter 4).Both, changes in the welfare in the search market as well as in the intermediated market are proportional to the amount of search cost.

These findings hold true, when rent regulation in the form of a reference level is introduced. In contrast to search cost, which is symmetrically for renters and landlords, price ceilings in the housing market show asymmetric effects. The more the distance between regulated and unregulated rental rate, the less welfare improving intermediation is. Moreover, excess demand, as in microeconomics general equilibrium is found and some remarks on spill-overs to other rental markets are made.

**Walrasian Market**

This section offers a simple market microstructure framework, which is used subsequently to introduce individuals' search behavior as well as intermediaries, who are from the market environment, in which governmental regulation and reference prices are analyzed.

As used in many market microstructure models (e.g. Glosten and Milgrom(1985), Kyle (1985), and Back (1992)), market size is normalized to unity. By this means a potential equilibrium quantity of 0.5 may be interpreted proportionally to any potential real market. Within this reference market model, assume a continuum of potential buyers with individual valuation $V_i$and sellers with a minimum required sales price of $S_j$.Regarding


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the real estate market, two assumptions must be noted:First, supply in real estate markets tends to be inelastic in two dimensions: At a given point in time, landlords observe a given quantity of residential properties, which cannot be stored. If a residential property is not rented in a given month, it cannot be rented twice in the following month. For that reason, real estate supply functions are usually drawn as vertical lines in the short-run. Moreover, an expansion in supply as reaction to increases in demand, is only feasible with a certain time lag. In contrast to the production of consumer goods or services, the ``production'' of real estate is time consuming and ranges between two and three years.

Usual real estate market models as Dokko et al. (1991), DiPasquale and Wheaton(1992), and Wheaton (1999) observe this lead-lag-structure, leading to the second real estate specific assumption: In the long-run, which is relevant within this context of equilibrium, the supply in a specific real estate market is not inelastic. Given a certain regional area or market segment as a specific type of apartment (e.g. with 2 living rooms), real estate users arbitrage. If the rental rate of an apartment with two living rooms becomes too expensive relative to other types, renters may leave this partial market either by moving to a different region or by renting less or more rooms.
Similarly, landlords' incentive to sell increases with their price expectation. For that reason, the long-run supply function in the following model is given as $S = S_j$.Note that the model implies unit order flow, which is usual in market microstructure and perfectly copes with individual behavior in real estate markets, where a substantial part of total amount of property is spread over a number of private individuals.

Beyond these assumptions, the basic framework of general equilibrium assumptions applies. Individuals on both market sides share perfect information on market conditions. Due to the initial absence of transaction costs, deviations from market equilibrium would be arbitraged immediately. This yields the usual coordination function of the Walrasian auctioneer generating maximal welfare.

In the context of the model, a potential Walrasian equilibrium requires$V \geq S$.Individual buyers' valuation needs to be sufficient to cover sellers' minimum required sales price.Given the normalized properties of the functions the quantity supplied perfectly copes with sellers' expected prices. Correspondingly, the demand function follows $D = 1 - V$.

Market clearing between buyers and sellers is achieved by the marginal buyer-seller-relation, where $V$ strictly corresponds to $S$.

$$1 - V = S \qquad (1)$$
$$1 - S = S \qquad (2)$$
$$S^* = \frac{1}{2} = V^* \qquad (3)$$

Given the market clearing quantity of $X^* = \frac{1}{2}$, the equilibrium price yields $\frac{1}{2}$as well.

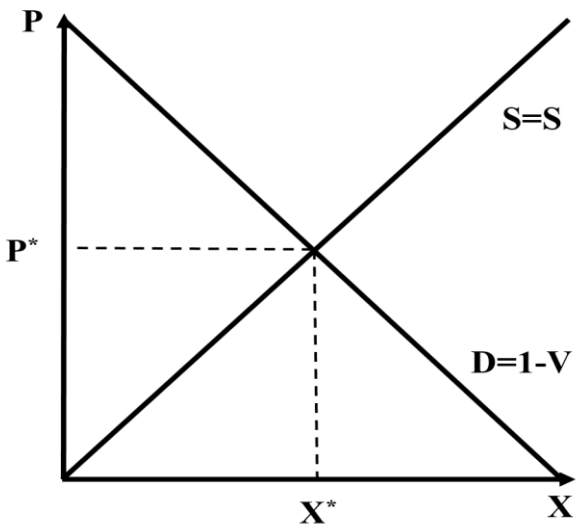


**Figure 1**: Illustration Walrasian Market

The figure graphically illustrates general equilibrium in the basic framework, where market clearing corresponds to $X^*$ and$P^*$at 0.5.


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**Transaction Costs and the Search Market**

While general equilibrium theory assumes homogenous goods, it is clear that the real estate market is highly heterogeneous. Compared to the purchase of apples or milk, transacting real estate requires more legal effort, and generates higher consumption risk for those, who do not transact real estate regularly. Moreover, the transaction frequency in the market framework of general equilibrium does not cope with the behavior in real estate markets, where it takes years before one relocates again. Some renters stay for decades and many owners buy real estate only once in a lifetime.

Given these aspects of transaction frequency, it is more difficult to find trading partners for both market sides. As a representation of market participants' efforts connected with the specific characteristics described above, a parameter for transaction cost $c$ is introduced on both market sides.Then, market equilibrium evolves to:

$$1 - V - c = S - c \qquad (4)$$

$$1 - 2c = 2S \qquad (5)$$

$$S^* = \frac{1}{2} - c = V^* \qquad (6)$$

The equilibrium quantity is symmetrical with $\frac{1}{2} - c$, while buyers' and sellers' (renters and landlords) prices differentiate to$P_B = \frac{1}{2} + c$ and to$P_S = \frac{1}{2} - c$.Comparing these results with the Walrasian equilibrium, the implementation of transaction costs reduces welfare.The equilibrium quantity is proportionally reduced by $c$, while it shows twice in the equilibrium price. Since renters and landlords face the same situation of uncertainty and search effort, $c$ is double sided.

Note that the real markets interpretation of $c$ extends to any aspect making it more difficult for renters and landlords to find transaction partners. Any form of market regulation such as new legal initiatives, increasing transaction efforts directly by monetary charges or indirectly by making it more difficult to find trading partners will increase $c$ in the context of the model.This means that, for example, a price cap which is certainly beneficial for some renters will generate negative effects for the market as a whole, and not only for landlords.

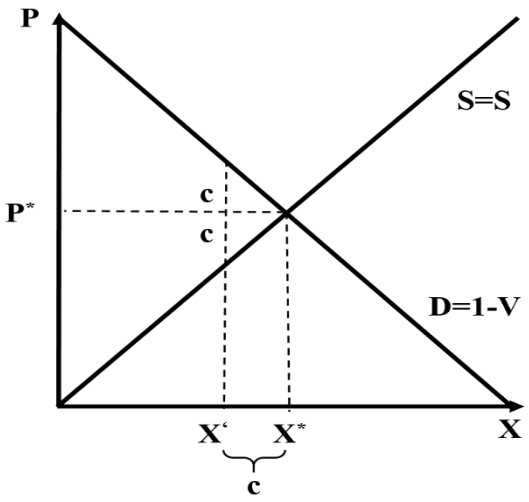


**Figure 2:** Transaction Costs

The figure graphically extends the basic framework of the model to transaction costs and introduces $X'$, which indicates a deviation from the initial equilibrium $X^*$due to the existence of $c$.

Figure 2 gives a graphical illustration of the effects generated by the introduction of transaction costs. The initial equilibrium quantity $X^*$reduces to $X'$ due to the existence of $c$, which bucks $P^*$to$P_B = \frac{1}{2} + c$ and to$P_S = \frac{1}{2} - c$.

Based on these results, assume that trade was only feasible in a search market, where Walrasian coordination fails. Although object heterogeneity and transaction frequency may not have changed, the nature of $c$ changes.Market participants can only form expectations about the other market side, which will affect the individual perspective of consumer and producer surplus. Renters' individual share of consumer surplus changes from $V_i - \frac{1}{2} - c$to $V_i - E[S_j] - c$.Correspondingly, landlords observe a change from $\frac{1}{2} - S_j - c$to$E[V_i] - S_j - c$.


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At first glance this looks like multiplicating uncertainty, since a renter with valuation 0.8 may match a landlord with minimum expected price of 0.4, but also with 0.7.While the latter was not active hitherto, he now has a certain probability of finding trading partners. However, this possibility falls with rational assumptions. Even if market size was not normalized to unity, it must be noted, that renters and landlords have a certain notion of market size and prices.

In a situation, where renters know that $S_j$ is equally distributed from 0 to 1, they can work out the probability of meeting a landlord with 0.7 as well as the probability of meeting one with only 0.4.Consequently, rational assumptions mean:

$$E[S_j] = \frac{1}{2} \quad (7)$$

$$E[V_i] = \frac{1}{2} \quad (8)$$

The setting and the results cope with the hypothesis of information efficiency formulated by Hayek (1949).Due to the information aggregation, rational expectations generate identical results as the hypothetical Walrasian market. As the following calculus shows, market clearing is identical to equation (6).Assume marginal traders with

$$V - \frac{1}{2} - c \geq 0 \quad (9)$$

$$V - \frac{1}{2} - c = 0 \quad (10)$$

$$V = \frac{1}{2} + c \quad (11)$$

$$\frac{1}{2} - S - c = 0 \quad (12)$$

$$\frac{1}{2} - c = S \quad (13)$$

and market clearing is again based on demand and supply with

$$1 - V - c = S + c \quad (14)$$

$$1 - S - c = S + c \quad (15)$$

$$1 - \left(\frac{1}{2} - c\right) - c = S + c \quad (16)$$

$$\frac{1}{2} - c = S \quad (17)$$

Correspondingly, the demand function is only served to $V = \frac{1}{2} - c$.

## 2. Intermediation

For simplicity, assume market entry by a monopolistic intermediary offering to match potential buyers and sellers at a specific charge $b$, which for simplicity is assumed to be symmetrical.[1]In the absence of searching individuals, the intermediary could optimize his charge monopolistically as follows:

$$\Pi = b \cdot V + b \cdot S - c \quad (18)$$

$$\Pi = 2b \cdot S - c \quad (19)$$

$$\Pi = 2b \cdot \left(\frac{1}{2} - b\right) - c \quad (20)$$

$$\Pi = b - 2b^2 - c \quad (21)$$

$$\frac{\partial \Pi}{\partial b} = 1 - 4b \stackrel{!}{=} 0 \quad (22)$$

$$\mathrm{b} = \frac{1}{4} \quad (23)$$

Note that in equation (18) it is assumed that the intermediary himself bears identical search costs as any other market participant. On the one hand, one could argue for higher cost on the intermediaries side, since he faces substantial marketing expenditures, which do not affect private individuals. On the other hand, however, having built up reputation and expertise his likelihood of finding trading partners is substantially higher as those of private individuals. For simplicity, it is assumed within the context of the model, that the intermediary must bear $c$ only once for matching two trading partners, while the aforementioned search market generated $c$ on both market sides.

Equation (19) shows that the intermediary obeys market clearing as before by equating $S$ and $V$ given the property that the loss in equilibrium quantity is proportional to transaction cost $c$, modified to $b$ in equation (20).A monopolistic intermediary would generate an equilibrium quantity of $\frac{1}{4}$, since $X^* = \frac{1}{2} - b$.

[1]In a more complicated version of the model, where the elasticities of demand and supply differ, a monopolistic intermediary would be able to balance asymmetric elasticities by setting $b$ differentially between buyers and sellers.


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Within the context of the model assumptions, it is clear that a monopolistic intermediary can cover his cost by $c \leq 2b$. However, the inequality becomes more important in a situation, where the intermediary competes with individuals' search incentives. In this case, search market and intermediary behave as Bertrand competitors, undercutting each other marginally. In order to remain monopolist, the intermediary sets $b \leq c$ and attracts all potential buyers and sellers yielding

$$\frac{1}{2}c \leq b \leq c \qquad (24)$$

Based on the amount of $c$, the intermediary is more or less flexible in setting $b$. For small values of $c$, he marginally undercuts to attract market participants. As soon as $2c \leq b$, he swichtes to the profit maximizing $b = 0.25$. To this extent the intermediary's compensation is proportional to the market situation, which is the case in real estate markets (within given boundaries).The stronger the asymmetry of the number of buyers and sellers in a specific region, the more intermediaries observe search cost and possess market power, particularly on the short market side. A variety of aspects affect search cost $c$ which transmits to $b$.The model shows, that the presence of the intermediary may be welfare improving and alleviate distortions in local real estate markets, which may be due to state interventions. One potential interpretation for this finding is, that regulation in real estate markets is partially absorbed and therefore must be strong enough. But to the contrary, intermediation in real estate markets can help to buffer not only in the interest of the intermediary himself, but also for market participants, which is particularly important in the face of strongly raising real estate prices or in the context of economic crises.

**Reference Prices**

The usual practice of regulation in real estate rental markets targets a specific form of reference price level as shown for example in Wölfle (2016).One strand of the literature as for example Jenkins (2009), Lind (2001), or Arnott (1995) concretely analyzes the effects of differential methodologies, how reference prices are affected. In particular, among the most actively discussed points are the differentiations of first and second generation rent controls, orienting at nominal or some form of real price levels, as well as the scope of regulation, which could be binding either for all rental contracts or only for new ones.As the welfare improving potential of intermediation is bounded by the assumption of how individuals form their expectations and by $c$, this chapter analyzes the way state regulation affects reference prices.

Note, that the equlibria in the antecedent sections were at or symmetrically around $\frac{1}{2}$, which built the basis for market participants' expectation formation.Consequently, from a theoretical point of view, one could analyze three potential szenarios by setting reference prices at, above or below $\frac{1}{2}$. However, two of these are almost irrelevant in real estate rental markets: If a reference price is set at or above the level of the equilibrium price, the market will remain as before. In the first case, individuals have no incentive to change behavior. In the second case, which is unrealistic in face of practical regulation, renters who know about the *true* equilibrium level will not accept landlords' claims above $\frac{1}{2}$.

If however, the reference is set below the equilibrium level, rental markets will be distorted, since renters try to shop around from one landlord to the next in order to find rental rates obeying to their modified expected value.In terms of equations (7) and (8), the calculus of consumer and producer surplus is modified to:

$$V_i - E[S_j|a] - c \qquad (25)$$

$$E[V_i|a] - S_j - c \qquad (26)$$

Where $a$ is a parameter corresponding to the impact state regulation generates on the reference


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price.By assumption, the reference price is set below the unregulated market equilibrium, i.e.$\frac{1}{2} - a$.Consequently, the number of landlords, who are able to cover their cost reduces proportionally:

$$\frac{1}{2} - a - S - c \geq 0 \qquad (27)$$

$$\frac{1}{2} - a - S - c = 0 \qquad (28)$$

$$S = \frac{1}{2} - a - c \qquad (29)$$

This however, does not correspond to the individual expectations of renters. Given that demand follows $D = 1 - V$, more potential individuals will engage on the demand side of the real estate rental market.

$$V - \left(\frac{1}{2} - a + c\right) \geq 0 \qquad (30)$$

$$V = \frac{1}{2} - a + c \qquad (31)$$

$$D = 1 - V \qquad (32)$$

$$V = 1 - \left(\frac{1}{2} - a + c\right) \qquad (33)$$

$$V = \frac{1}{2} + a - c \qquad (34)$$

As in the Walrasian equilibrium with price caps, state intervention affecting the reference price by $a$ generates a proportional amount of excess demand in the market beyond the amount of transaction cost $c$.While the effects generated by $c$ are spread symmetrically over both market sides, the effect in $a$ is asymmetrical as the following figure 3 illustrates.

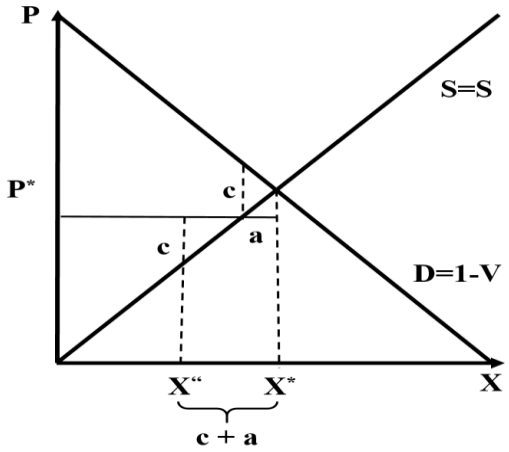


**Figure 3:** Illustration Reference Price below Market Value

The figure graphically illustrates the effects of state intervention to reference prices in combination with transaction cost in this market environment.

Moreover, consequences for the intermediary can be analyzed by means of his optimization calculus:

$$\Pi = 2b \cdot \left(\frac{1}{2} - a - b\right) - c \qquad (35)$$

$$\Pi = b - 2ab - 2b^2 - c \qquad (36)$$

$$\frac{\partial \Pi}{\partial b} = 1 - 2a - 4b \overset{!}{=} 0 \qquad (37)$$

$$\mathrm{b} = \frac{1}{4} - \frac{1}{2}a \qquad (38)$$

As comparative statics show, the intermediaries' compensation is negatively affected by the strength of state regulation. On the one hand, a reduction in $b$ looks beneficial to all market participants.It comes however, at a cost.In competition with the search market, the intermediary contributed to the economic welfare by integrating double-sided transaction cost due to search activities. As has been shown, his effect on market equilibrium was proportional to the amount of $c$.While the intermediary was able to partially offset $c$, $a$ complementarily reduces economic welfare as well.However, it affects demand and supply asymmetrically. In contrast to $c$, it cannot be reduced by the intermediaries' activities.To the contrast, equation (38) shows, that $a$ reduces his potential to improve economic welfare.In other words, the initial effect of $c$ reducing the equilibrium quantity is aggravated by $a$.

Another negative effect of state intervention on reference prices below the equilibrium must be noted: Surplus demand, multiplicating individual search behavior on the demand side of the market. In the context of the real estate rental markets, this effect shows up over the medium and long term in the form of more renters (partially with low willingness to pay) competing for the same apartment. As a long term reaction, it will be easier for landlords to select among a larger


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number of renters and potentially investment in the quality of rental real estate may decrease. Moreover, the shortage in supply stimulates black market activities as the Northern American experience with ”key money” shows (e.g. Arnault (1975), Smith (1988), or Haffner et al. (2008)).

To concretely determine the range, in which $b$ can be found in the market the intermediary behaves as before:His pricing is bound on the one side by the zero profit condition of $\frac{1}{2}c \leq b$ and on the other side by $c$ itself. Substituting equation (38) yields:

$$\frac{1}{2}c < \frac{1}{4} - \frac{1}{2}a \qquad (39)$$

$$c < \frac{1}{2} - a \qquad (40)$$

$$c + a < \frac{1}{2} \qquad (41)$$

Before the introduction of reference prices, the intermediary could only serve the market until $c < \frac{1}{2}$. Equation (41) shows that $a$ proportionally restricts his trading volume. As long as equation (41) yields positive profits, the intermediary will marginally undercut $c$ as long as the following condition holds:

$$\frac{1}{4} - \frac{1}{2}a < c \qquad (42)$$

$$\frac{1}{4} < c + \frac{1}{2}a \qquad (43)$$

Beyond specific effects in the partial market, general economic effects emerge. Assume reference prices, which are only binding for one partial market, while others remain unregulated. Then, the determined excess demand not only affects the target market, it will flash over to other market segments as well. As figure 3 shows, renters with high values of $V_i$ are still served by the market after the introduction of regulation, while excess demand is basically generated by renters with low willingness to pay.Shopping around for alternatives, these individuals will certainly not show up in partial markets with higher equilibrium prices, but will force demand sided competition in low price markets. Concretely, this addresses apartments in the same area with smaller living space or less rooms, lower quality or apartments in a different area, usually with higher distance to workplaces or other infrastructures.

While a first notion of price caps in public view may be beneficial for renters, the concrete analysis shows a differential view in a social dimension. Only those renters, who have a low probability of moving may profit, while for all other renters it becomes less probable to find an apartment. As already pointed out by Arnott (1988)this may negatively affect other segments of the real economy. Increasing the barriers to achieve the workplace due market regulation indirectly affects the production potential of the whole economy.

**Implications**

Comparing market prices and trading volume over the market settings shown before helps to assess the intermediaries' welfare contribution. Clearly, within the Walrasian setting, an intermediary cannot improve welfare as it already amounts to its maximal value. However, he will certainly improve the situation after the introduction to a simple search market (without reference price effect).In this case, the intermediary marginally undercuts $c$ as long as he makes positive profits from intermediation ($b > \frac{1}{2}c$) and $c \leq \frac{1}{8}$.

Since the profit maximizing value of $b$ was found with $\frac{1}{4}$, the intermediary will set $b = \frac{1}{4}$ soon as $c$ passes $\frac{1}{8}$.

**Table 1:** Trading Volume in Search Market

| | c = 0 | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 |
|---|---|---|---|---|---|---|
| Search Market | 0.5 | 0.4 | 0.3 | 0.2 | 0.1 | 0 |
| with Intermediary | 0.5 | 0.4 | 0.3 | 0.25 | 0.25 | 0.25 |

The table compares trading volume showing traded quantities in the search market in the second row and the quantity traded with the intermediary in row three.


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Table 1 reveals that the intermediary is particularily welfare improving in situations with high amounts of search cost, where his market effect remains neutral in environments with low search cost. Extending this comparison to the setting(s) with reference prices affected by national regulation adds another dimension to the analysis: the impact of $a$, shortening the supply side of the market.

Whenever $a + c$ surpasses $\frac{1}{2}$ the intermediary cannot engage in transactions.Since this effect is similar to the search market, it can already be seen from the following table of trading volumes in a search market before the intermediary is introduced.

**Table 2:** Trading Volume in Search Market with Reference Price

| | c = 0 | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 |
|---|---|---|---|---|---|---|
| a = 0 | 0.5 | 0.4 | 0.3 | 0.2 | 0.1 | 0 |
| 0.1 | 0.4 | 0.3 | 0.2 | 0.1 | 0 | 0 |
| 0.2 | 0.3 | 0.2 | 0.1 | 0 | 0 | 0 |
| 0.3 | 0.2 | 0.1 | 0 | 0 | 0 | 0 |
| 0.4 | 0.1 | 0 | 0 | 0 | 0 | 0 |
| 0.5 | 0 | 0 | 0 | 0 | 0 | 0 |

The table shows trading volume in a search market with reference prices in the absence of an intermediary.

After the introduction of the intermediary, trading volume raises again, in particular in situations with high search cost $c$.Comparing the results over the tables, it can be seen, that with and without reference prices, the intermediary is welfare improving in a situation of uncertainty about finding trading partners. However, his welfare contribution is dramatically hit by the effect of $a$, i.e. the amount by which regulation is trying to affect the market equilibrium.Table 3 shows only a small number of combinations, in which the intermediary is beneficial to market outcome. Whenever introducing price ceilings, the regulating authority should not only be concerned about direct effects for the potential market quantity offered at the supply side of the market. As shown in the numerical tables, the quantitative effect interferes with intermediaries activities in markets with uncertainty about finding trading partners.

**Table 3:** Trading Volume with Reference Price and Intermediary

| | c = 0 | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 |
|---|---|---|---|---|---|---|
| a = 0 | 0.5 | 0.4 | 0.3 | 0.25 | 0.25 | 0 |
| 0.1 | 0.4 | 0.3 | 0.2 | 0.2 | 0 | 0 |
| 0.2 | 0.3 | 0.2 | 0.15 | 0 | 0 | 0 |
| 0.3 | 0.2 | 0.1 | 0 | 0 | 0 | 0 |
| 0.4 | 0.1 | 0 | 0 | 0 | 0 | 0 |
| 0.5 | 0 | 0 | 0 | 0 | 0 | 0 |

The table shows trading volume in a search market with reference prices with presence of an intermediary.

## Conclusion

As the literature shows, regulation in rental markets is neither new nor specific to a certain segment of the market, local area or country. Most empirical and theoretical studies on real estate regulation cope perfectly with the propositions of microeconomics market theory under price ceilings. This finding holds also true for this paper. However, it analyzes the stability of these propositions in the context of a search market with intermediation. The model shows, that intermediation may be welfare improving in real estate markets. In particular, real estate brokers welfare contribution is proportional to search cost, which may be affected (aggravated) by state intervention.

Due to the fact that individuals in a search market must form expectations about trading partners and market prices, the model also introduced state intervention on the level of expectation formation. Whenever, reference prices are set below an unregulated equilibrium, the model copes with the


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general microeconomic conclusion, that welfare is reduced and excess demand is generated. Moreover, it is shown, that market regulation affects the welfare improving potential of intermediaries as well. The distance between unregulated price level and maximum price converts proportionally to the price setting behavior of intermediaries and reduces their potential to improve welfare.

Finally, setting reference prices below the market level not only distorts partial markets. Within a specific market, it invites renters at the lower end of the demand function, who usually observe low willingness or ability to pay. To the one hand, these renters engage in competition in a specific market, but to the other hand they flash over to other market segments as well, as long as they may expect to find lower prices. This may aggravate social conflicts in the low price segment of the rental market or force people to move to different areas, with potentially negative effects for the production potential of the whole economy.

**References**

1. Alston, R., J. Kearl, and M. Vaughan, "Is there a consensus among economists in the 1990s?",American Economic Review, 1992, 82 (2), 203-9.
2. Arnault, J., "Optimal Maintenance Under Rent Control With Quality Constraints", American Real Estate and Urban Economics Association Journal,1975, 3 (2), 67-82.
3. Arnott, R., "Rent Control: The International Experience", Journal of Real Estate Finance and Economics, 1988, 1, 203-15.
4. Arnott, R., "Time for Revisionism on Rent Control?",Journal of Economics Perspectives, 1995, 9 (1), 99-120.
5. Back, K., "Insider trading in continuous time", The Review of Financial Studies, 1992, 5 (3), 387-409.
6. Block, W., "A Critique of the Legal and Philosophical Case for Rent Control", Journal of Business Ethics, 2002, 40, 75-90.
7. DiPasquale, D. and W. Wheaton, "The Markets for Real Estate Assets and Space:A Conceptual Framework",Journal of the American Real Estate andUrban Economics Association, 1992, 20 (1), 181-197.
8. Dokko, Y., R. H. Edelstein, M. Pomer, and E. Scott Urdang, "Determinants of the Rate of Return for Non-residential Real Estate: Inflation Expectations and Market Adjustment Lags", Journal of the American Real Estate and Urban Economics Association, 1991, 19 (1), 52-69.
9. Eichenbaum, M., N. Jaimovich, and S. Rebelo, "Reference Prices and Nominal Rigidities", NBER Working Paper 13829, 2008.
10. Fabrizi, S., S. Lippert, C. Puppe, and S. Rosenkranz, "Suggested Retail Prices with Downstream Competition", CEPR Working Paper, 2012.
11. Glosten, L.R. and P.R. Milgrom, "Bid, Ask, and Transaction Prices in a Specialist Market with Heterogeneously Informed Traders", Journal of Financial Economics, 1985, 14 (1), 71-100.
12. Gneezy, A., U. Gneezy, and O. Lauga, "A Reference-Dependent Model of the Price-Quality Heuristic",Journal of Marketing Research, 2014, 51, 153-64.
13. Haffner, M., M. Elsinga, and J. Hoekstra, "Rent Regulation: The Balance between Private Landlords and Tenants in Six European Countries", European Journal of Housing Policy, 2008, 8 (2), 217-33.


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14. Hayek, F., "The Use of Knowledge in Society", American Economic Review, 1945, 35 (4), 519-30.
15. Jenkins, B., "Rent Controls: Do Economists Agree?",Economics Journal Watch, 2009, 6 (1), 73-112.
16. Kyle, A., "Continuous auctions and insider trading", Econometrica, 1985, 53(6), 1315-35.
17. Lind, H., "Rent regulation: A conceptual and comparative analysis", European Journal of Housing Policy, 2001, 1 (1), 41-57.
18. Priemus, H., "The Rental Letter of Housing Minister Dekker: Too Early and Too Complicated", European Journal of Housing Policy, 2006, 6 (2), 221-35.
19. Smith, L., "An Economic Assessment of Rent Controls: The Ontario Experience", Journal of Real Estate Finance and Economics, 1988, 1, 217-31.
20. Urbany, J., W. Bearden, and D. Weilbaker, "The Effect of Plausible and Exaggerated Reference Prices on Consumer Perceptions and Price Search", Journal of Consumer Research, 1988, 15, 95-110.
21. Wheaton, W., "Real Estate "Cycles": Some Fundamentals", Real Estate Economics, 1999, 27 (2), 209-230.
22. Wölfle, M., „Mietregulierung - eine Analyse im internationalen Vergleich", Swiss Real Estate Journal, 2016, 12, 43-51.


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DOI: 10.18535/afmj/v2i11.02
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