Spatial Variation in Incentives to Work and Hysteresis in Welfare

by

Kristof Dascher*

Final Version: March 2003
(Submitted: March 10th 2002)

Abstract: The paper is an attempt to suggest a novel explanation of the steady rise in Germany’s welfare recipient numbers. In the paper’s model, there are disadvantaged households employed in a city with few amenities ("bad-amenity-city") who would prefer to receive welfare in a city with many amenities ("good-amenity-city"). They can be kept out by the good-amenity-city’s local government – but only until a recession sets in. Then they do move from employment in the bad-amenity-city into welfare in the good-amenity-city. Hysteresis in welfare results.

JEL-Classification: E24, H53, I38, J61, R23

Keywords: Hysteresis, Welfare

Kristof Dascher
Economics Department
Europa-Universität Viadrina
Postbox 1786
D - 15 207 Frankfurt (Oder)
Email: dascher@euv-frankfurt-o.de
http://viadrina.euv-frankfurt-o.de/~dascher

* Acknowledgments: A previous version of the paper had the title "Subsidizing Welfare Recipients’ Housing Produces Hysteresis in Welfare Recipients’ Numbers." – I am grateful for stimulating comments by Hermann Ribhegge, two anonymous referees, the editor, Antje Baier, Friedel Bolle, Yves Breitmoser, Agnieszka Podzerek-Knop as well as seminar participants at the DIW, at the Dublin Economic Workshop, at the IIPF 2002 and at the Verein für Socialpolitik meeting in Innsbruck. Any remaining errors are mine.
1. Introduction

Why have Germany’s welfare recipient numbers kept rising over the last three decades? At least three key explanations are offered in the literature. First, according to Riphahn (2001), recipient numbers have been driven by an increase in involuntary unemployment. Second, according to Leibfried (1995), welfare recipient numbers have also been propelled by the increase in single parent families. Third, following Deutsche Bundesbank (1996) and Seitz/Kurz (1999), among others, German welfare, or, “Sozialhilfe”, has provided welfare recipients with insufficient incentives to reenter the labor market.

This paper is an attempt to add to the third, i.e., the incentive-based, strand of the literature. With it the paper shares an interest in the labor supply effects of the welfare system’s institutional design. In contrast to much of this strand, however, the paper’s focus is not on “the” incentive to work. Rather, it is on the inter city variation in the incentive to work. This paper will argue that (1) there is inter city variation in the incentive to work, and that (2) this variation may contribute to our understanding of why Germany’s aggregate welfare recipients numbers have kept rising over the last three decades. A brief outline of this paper’s theme is as follows:

On the one hand utility from receiving welfare, so the specific design of Germany’s welfare system suggests, should vary across cities: Welfare recipients living in cities with attractive amenities (“good-amenity-cities”) should be better off than those in cities with not as attractive amenities (“bad-amenity-cities”). On the other hand, utility from working, so spatial equilibrium suggests, cannot vary across cities. As a result, there will be inter city variation in the incentive to work. As a result, also, there will be households working in the bad-amenity-city who would prefer to receive welfare in, and hence are tempted to move into, a good-amenity-city.

We find that, under one reasonable restriction on household mobility, these ”tempted households” make this move only during recession. Roughly, while it is the welfare system’s design that seduces tempted households to want to move from employment in a bad-amenity-city to welfare in a good-amenity-city, it is only recession that enables tempted households to do so. After recession these households will not want to remigrate. Rather, they go on being welfare recipients in the good-amenity-city they have migrated to.
while they would have returned to the labor market had they stayed in the bad-amenity-city they came from. What we observe is a "ratchet effect", or, *hysteresis in welfare*. Similar to the discussion of hysteresis in other contexts, there is an *interaction effect* between recession on the one hand and a society’s institutions on the other hand (see, e.g., Bertola/Blau/Kahn (2001)).

In psychological or sociological explanations of hysteresis in welfare, households become "used to", or "dependent on", welfare (e.g., see Lémieux/Blais/Leibfried (1998) and Leibfried (1995)). In such explanations, it is welfare recipients’ preferences that change during recession. In explanations of hysteresis in involuntary unemployment, it is union membership and/or the number of insiders that change during recession (e.g., see Blanchard/Summers (1987) and Lindbeck/Snower (1988)). In this paper’s explanation of hysteresis in welfare, it is the *spatial allocation of disadvantaged households* that changes during recession.

Klein (1989) is an early paper on variation in incentives to work in Germany. But Klein’s focus is on variation across Bundesländer while this paper is on variation across cities. To be sure, the cash grant component of Germany’s "Sozialhilfe" is very nearly the same in every city. However, precisely by being the same the cash grant fails to take into account the inter city variation in urban amenities. Within an American context, Kaplow (1995) and Glaeser (1998) suggest that such failure gives rise to welfare recipient migration. Within a German context, this paper suggests that such failure not just produces welfare recipient migration. Also, when joined by recession it may give rise to hysteresis in welfare. – In section 2 we introduce the key assumptions; in section 3 we discuss equilibrium conditions. Section 4 illustrates how a temporary recession interacts with Germany’s institutional setup. In section 5 we analyze this interaction within the complete general equilibrium model. Conclusions are in section 6.

2. The Model
2.1 The Key Assumptions

Households live in either of two cities. These differ with respect to the level of a pure local public good, or, ”amenity”, $G$ provided by local government. There are no interurban spillovers. The city with the lower (higher) amenity level is city 1 (city 2). For later reference,
Local wages \( w_i \) \((i = 1, 2)\) (where \(i\) is the city index) may, but need not, differ across cities. Since the amenity only provides an externality in consumption (but not in production), we cannot (but also need not) be specific on which city has the higher wage. – From the individual household’s perspective, both local amenities and local wages are exogenous. Local amenity levels are fixed over time; but wages are not fixed. Rather, changes in wages later will represent regional, or even macroeconomic, shocks to the two cities’ labor markets. – All households share the following quasilinear utility function:

\[
U(y, G) + x - z
\]

where \(y\) is housing, \(x\) is a composite consumption good, and \(z\) is disutility from working or, ”cost-of-effort”. Preferences are not identical because \(z\) may vary across households. We assume that \(U_y, U_G > 0\). Also, \(U_{yy} < 0\). – There are three types of households native to each city \(i \) \((i = 1, 2)\). As natives to \(i\) there are \(A_i\) A-households, \(B_i\) B-households, and \(C_i\) C-households. We identify households by referring to the city they are native to. Then we also write city 1 A’s for A’s native to 1, city 2 A’s for A’s native to 2, etc.\(^1\) We assume that households differ in cost-of-effort. C’s and B’s do not exhibit any cost-of-effort. But A’s do. A’s form a heterogenous group of ”disadvantaged” households. Their heterogeneity is captured by \(\mu_i(z)\), the cumulative distribution function (c.d.f.) of city \(i\) A’s with respect to effort \(z\). More precisely, \(\mu_i(z) : [0, \tau] \mapsto [0, 1]\), where \(\tau > 0\). We assume that \(\mu_{iz} > 0\) but otherwise there are no restrictions on \(\mu_i(z)\).

All households have equal skills. Also, all households are endowed with one unit of time which they may wish to supply to the labor market. C’s own one unit of housing each in the city they live in; C’s are the model’s landlords. A’s and B’s rent housing from C’s living in the same city; A’s and B’s are the model’s renters.

There are two different types of possible moves in the model. Households may be able to make costless ”occupational moves” (or, ”switch work sta-

\(^1\)When the discussion applies to both cities alike, we more shortly write A’s, B’s, and C’s.
tus”) when moving from unemployment to employment, or vice versa. And they may be able to make costless “spatial moves” (i.e., “switch cities”) when moving from one city to the other. Specifically, landlords may only make occupational moves, but no spatial moves. Renters, in contrast, are much freer to move. Each A and B may: (i) continue the current work status but switch cities, (ii) switch work status but continue to live in the current city, or (iii) make a combined move by switching from unemployment in one city to employment in the other city².

The remaining combined move (iii) is where a household moves from employment in one city into unemployment in the other city. For two reasons we will rule out this combined move (iii) throughout the paper. First, we focus on households who are not, or not sufficiently, eligible for unemployment insurance benefits³. Hence, moving from employment in one city into unemployment in the other city would mean moving into welfare. Below we suggest that the principles underlying Germany’s “Sozialhilfe” are inconsistent with this move (section 3). Moreover, and second, below we show that this move is not just against the interests of, but can also be prevented by, both local governments (section 5.2).

Local government in each city is run by that city’s landlords. After all, only immobile C’s, but not perfectly mobile A’s and B’s, have a stake in the local economy. This assumption is common in the literature on local public finance, e.g., see Wildasin (1987). We assume that C’s bear all costs of running local government. A’s and B’s do not pay any taxes. This reflects our interest in the welfare system’s impact on labor market participation, rather than in taxation’s impact on mobile households’ migration. We let $t_i$ denote a representative landlord’s share in $i$’s local public expenditures. For simplicity, we refer to $t_i$ as a ”tax” on landlords even though, strictly speaking, landlords and local government are identical.

²As one referee has pointed out, allowing for moving from welfare in one city into welfare in the other city amounts to excluding some foreigners resident in Germany from the analysis. According to a decision taken by the Bundesverfassungsgericht (Germany’s Constitutional Court) on February 9th 2001 (AZ 1 BvR 781/98), foreigners with a certain type of residence permit may only be granted restricted access to “Sozialhilfe” once they leave the Bundesland that issued the residence permit.

³This need not be a serious restriction. Many of Germany’s unemployed are entitled only to insufficient unemployment insurance benefits and hence receive additional transfers from welfare. Moreover, many others are not entitled to unemployment insurance benefits at all and hence completely rely on welfare.
The price of housing is $q$, where $q$ may vary across cities. The price of the tradable composite good is everywhere the same and set equal to 1. Housing is immediately ready for use; there is no production of housing. The composite good is produced in a perfectly competitive industry. In each city, identical firms employ labor as the only input, using a simple linear production function with location-specific labor productivity. Then the local industry’s equilibrium real wage just equals local labor productivity. Any shocks in wages, to be discussed later, really are shocks in local productivity.

2.2 Utility from Working

Any working household supplies one unit of labor to the labor market in his city of residence. He receives the wage $w_i$ in turn. Because household skills are identical, wages do not differ across household types. Then in city $i$ the household budget constraints are $w_i + q_i - t_i = q_i y_i^C + x_i^C$ for working C’s, $w_i = q_i y_i^B + x_i^B$ for working B’s, and $w_i = q_i y_i^A + x_i^A$ for working A’s. Maximizing (2) for any given individual budget constraint yields

$$U_{iy}(y_i, G_i) = q_i$$

as one of the first order conditions (where we have dropped the household index but included the city index). Equation (3) is a necessary condition for all households and implicitly gives working households’ Marshallian demand for housing $\tilde{y}_i(q_i, G_i)$. In what follows we simply write $\tilde{y}_i$. Given our earlier assumptions, demand’s response to a change in rent is $\tilde{y}_{iq} < 0$. – Indirect utility for working B’s is

$$V^B_i(q_i, w_i, G_i) = U(\tilde{y}_i, G_i) + w_i - q_i \tilde{y}_i$$

Then indirect utilities for working A’s are $V^A_i(q_i, w_i - z, G_i) = V^B_i(q_i, w_i, G_i) - z$, depending on $z$. Indirect utility for working C’s is $V^C_i(q_i, w_i - t_i, G_i) = V^B_i(q_i, w_i, G_i) + q_i - t_i$. For later use (in section 5) we also observe that $V^A_{iq} = V^B_{iq} = -\tilde{y}_i$, $V^C_{iq} = 1 - \tilde{y}_i$, and $V^A_{iw} = V^B_{iw} = V^C_{iw} = 1$. Note that $V^C_i > V^B_i \Leftrightarrow q_i > t_i$. Throughout the model, we assume these inequalities to hold (because, say, the number of C’s is large enough to keep taxes low).
2.3 Utility from Not Working: The Welfare Régime

Local government makes welfare payments to its local welfare recipients. The welfare system’s design is exogenous, e.g. set by federal government, and is as follows: First, a welfare recipient does not need to pay at all towards housing. Second, each welfare recipient receives the same cash grant $S$, irrespective of his location. Third, each welfare recipient may only consume housing up to the maximum feasible amount $\bar{y}$. Importantly, $\bar{y}$ is the same in both cities.$^4$ Fourth, maximum feasible housing always falls short of a working household’s housing: $\bar{y} < \bar{y}_i$ ($i = 1, 2$).

Each welfare recipient will want to consume the maximum feasible amount of housing: After all, up to $\bar{y}$ housing is free. Then the housing subsidy $q_i\bar{y}$ is higher in the more expensive city. There is ”spatial indexation”. A welfare régime complete with all properties listed above we more briefly call "Spatial Indexation of Housing Subsidies " (SIHS). – For the fixed local amenity level, any welfare receiving A’s or B’s maximum utility in $i$ is$^5$:

$$V^W_i(G_i) = S + U(\bar{y}, G_i) \quad (i = 1, 2) \quad (5)$$

But then, given the welfare régime, as captured by SIHS, and given the amenity’s spatial variation, as captured by (1), it is always better to receive welfare in city 2 than in city 1$^6$:

$$V^W_2(G_2) > V^W_1(G_1) \quad (6)$$

The reason is that a welfare recipient in a good-amenity-city – as opposed to a working household in a good-amenity-city – does not pay the implicit price

--

$^4$According to Rosen (1995), housing subsidies could reflect government’s concern about welfare recipients’ housing consumption. It would seem inconsistent with such "paternalism" to allow $\bar{y}$ to vary across cities. And in fact, the discussion of the German welfare régime in Dascher (2001), at least, suggests that $\bar{y}$ does not vary much.

$^5$This equation does not apply to C’s. C’s earn rent income, and need to pay taxes, even if not working. For them, utility from receiving welfare is $V^W_i(G_i) + q_i - t_i$. C’s in fact will never turn to welfare (see below), so here we restrict attention to A’s and B’s’ utility from receiving welfare.

$^6$This idea is familiar from Commission on Housing in Germany (1995), Kaplow (1996), and Glaeser (1998). Note the potential implications for local government’s incentive to provide the optimal level of the local public good. In a related setup in Dascher (2001), local government stops short of providing the optimal level of the amenity, in fear of driving additional disadvantaged households into welfare.
of being close to a better amenity, i.e., the difference in rent. Government, instead, pays. Effectively, SIHS fixes welfare payments’ power to purchase private goods (i.e., \(x\) and \(y\)). This translates into equal recipient utility across space if and only if the local public good (i.e., \(G\)) is the same\(^7\).

Would an A, if living in \(i\), prefer working in \(i\) to receiving welfare in \(i\)? We define marginal cost-of-effort for city \(i\), denoted \(\tilde{z}_i\), as that cost-of-effort-level in \(i\) burdened with which any A would find working in \(i\) and not working in \(i\) equally (un)attractive. Implicitly, \(\tilde{z}_1\) and \(\tilde{z}_2\) are defined by

\[
V^A_1(q_1, w_1 - \tilde{z}_1, G_1) = V^W_1(G_1) \tag{7} \\
V^A_2(q_2, w_2 - \tilde{z}_2, G_2) = V^W_2(G_2) \tag{8}
\]

respectively. As discussed shortly, we will assume that \(V^B_i(q_i, w_i, G_i) > V^W_i(G_i)\) (\(i = 1, 2\)): So B’s always work. But if B’s – with cost-of-effort equal to zero – always work, then in both cities at least some A’s – those with cost-of-effort sufficiently close to zero – also always work. This implies \(\tilde{z}_i > 0\). To this we add the reasonable assumption that \(\tilde{z}_i < \bar{z}\). Then (7) and (8) both have interior solutions for \(\tilde{z}_1\) and \(\tilde{z}_2\). Intuitively, \(\tilde{z}_i\) ”splits” any A’s present in \(i\) into those who prefer to work (with \(z \leq \tilde{z}_i\)) and those who prefer not to work (with \(z > \tilde{z}_i\)). – Finally, note that all unemployment is voluntary.

3. Spatial and Occupational Equilibrium

We turn to equilibrium with respect to spatial and occupational moves. Specifically, such a ”no move equilibrium” requires that no A or B prefers to live elsewhere while keeping his current work status (”No Spatial Move”), that no A, B, or C prefers to change his work status while staying in his current location (”No Occupational Move”), and that no A or B prefers to move from unemployment in one city to employment in the other city (”No Combined Move”).

---

\(^7\)There is no mechanism of congestion affecting welfare recipients in the popular city, 2, here. Via SIHS, welfare recipients are sheltered from rent changes. But even in an extended model taking account of road congestion, welfare recipients could still protect themselves by choosing traveling hours outside rush hours. This assumption is used, for instance, in Cogan (1981). (A possible congestion mechanism, ignored here, could arise via having to queue in the local government’s welfare office.)
**B-households and C-households:** Perfect mobility across space implies that B’s utility from working is equal in both cities:

\[ V_B^1(q_1, w_1, G_1) = V_B^2(q_2, w_2, G_2) \]  \hspace{1cm} (9)

Let \( V^B = V^B(w_1, w_2, q_1, q_2, G_1, G_2) \) denote the utility common to both cities. We assume that

\[ V_B > V^W_i(G_i) \hspace{1cm} (i = 1, 2) \]  \hspace{1cm} (10)

Implicitly our understanding is that wages \( w_1 \) and \( w_2 \) are sufficiently large to always make B’s want to work. This is a "calibrating assumption": it ensures the existence of a working middle-class. – For C’s, utility from working is \( V^B + q_i - t_i \) while utility from not working is \( V^W_i(G_i) + q_i - t_i \). Since B’s always prefer to work, C’s also always prefer to work. – To summarize, given (10), no B or C will want to be unemployed. Given (9), no B will want to work in the other city.

**A-households:** As the first step towards equilibrium conditions for A’s, we point to an important link between working B’s and working A’s. Assume that working A’s move across space after working B’s do. After all, since A’s are disadvantaged relative to B’s, they might plausibly be thought to be "less perfectly mobile". Subtracting \( z \) from both sides of (9) and replacing \( V_B^i(q_i, w_i, G_i) - z \) by \( V_A^i(q_i, w_i - z, G_i) \) gives

\[ V_A^1(q_1, w_1 - z, G_1) = V_A^2(q_2, w_2 - z, G_2) \]  \hspace{1cm} (11)

Given that working B’s are slightly "quicker", working A’s, though perfectly mobile, never actually find it worthwhile to move into work in the other city.

As the second step towards equilibrium conditions for A’s we define the two following variables. First, let \( \tilde{Z}_1 \) split city 1 A’s into two groups: On the one hand there are those who work in 1, of total group size \( \mu_1(\tilde{Z}_1)A_1 \). On the other hand there are those who receive welfare in 2, of total group size \( (1 - \mu_1(\tilde{Z}_1))A_1 \). Second, let \( \tilde{Z}_2 \) split city 2 A’s into two groups, also: On the

\(^8\)We assume throughout the paper that (10) is never binding so that we can safely ignore (10).
one hand there are those who work in 2, of total group size $\mu_2(\hat{Z}_2)A_2$. On the other hand there are those who receive welfare in 2, of group size $(1 - \mu_2(\hat{Z}_2))A_2$. Effectively, the pair $(\hat{Z}_1, \hat{Z}_2)$ captures an allocation of A’s across cities (1 or 2) and occupations (employed or unemployed). We emphasize the asymmetry in the definitions: $\hat{Z}_2$ merely splits city 2 A’s across occupations within city 2; whereas $\hat{Z}_1$ splits city 1 A’s across occupations as well as across cities. $(\hat{Z}_1, \hat{Z}_2)$ is an equilibrium allocation of A’s if and only if (9) and the following two conditions are met:

\begin{align*}
\hat{z}_2 &\leq \hat{Z}_1 \leq \hat{z}_1 \\
\hat{Z}_2 &= \hat{z}_2
\end{align*}

A formal argument is in Appendix 1; the idea is illustrated in Figure 1. In Figure 1, the two utility levels from being welfare recipient in city 1 or 2, i.e., $V_1^W(G_1)$ and $V_2^W(G_2)$, are shown as horizontal lines. Any A’s utility from working in either of the two cities can be read off the straight line with slope minus one, i.e., $V^B - z$. The two intersections P and Q indicate the marginal cost-of-effort levels $\hat{z}_2$ and $\hat{z}_1$, respectively. The thick graphs represent the supports of the two c.d.f.’s. The upper (lower) thick graph indicates whether or not city 2 A’s (city 1 A’s) work, and, if they do not work, which city it is they receive welfare in. The graphs do not inform us about the location of working households. We define the graphs to indicate ”working in native city” whenever the graphs indicate ”working”. FIGURE 1

In Figure 1 we assume that $\hat{Z}_1 = \hat{z}_2$, i.e., the first inequality in (12) is binding. In Figure 2 we assume $\hat{Z}_1 = \hat{z}_1$, i.e., the second inequality in (12) is binding. In neither Figure any household will want to make any of the feasible moves. Both allocations of A’s are compatible with equilibrium. In fact, the Figures suggest that any $\hat{Z}_1$ between $\hat{z}_2$ and $\hat{z}_1$ is compatible with equilibrium. There are multiple equilibria, where $\{(\hat{Z}_1, \hat{Z}_2) : \hat{z}_2 \leq \hat{Z}_1 \leq \hat{z}_1 \text{ and } \hat{Z}_2 = \hat{z}_2\}$ is the set of equilibrium allocations. FIGURE 2

City 1 and city 2 differ in two important ways. First, due to (6) city 2 suffers from a greater disincentive to work than city 1. A’s in 1 only resign from

---

There are many other equilibria. We note, though, that through (9), (12) and (13) we capture all equilibria that can be described using the definitions $\hat{Z}_1$ and $\hat{Z}_2$.
working if their individual cost-of-effort exceeds \( \tilde{z}_1 \); A’s in 2 already resign from working if their individual cost-of-effort exceeds \( \tilde{z}_2 < \tilde{z}_1 \). This is an SIHS-induced labor market withdrawal effect, as in Dascher (2001). Moreover, and second, city 2 suffers from welfare recipient immigration. Given (6), any welfare recipient in 1 will strictly prefer to be, and hence immediately become, a welfare recipient in 2. This is an SIHS-induced welfare recipient migration effect, and is reminiscent of welfare recipient migration discussed in the literature on local redistribution in the federal state, as in, e.g., Wildasin (1991)\(^{10}\). – The two asymmetries are also reflected by the two cities’ local government budgets (where \( K(G_i) \) is the (fixed) cost of providing \( G_i \)):

\[
\begin{align*}
C_{1t1} &= K(G_1) \\
C_{2t2} &= (1 - \mu_1(\tilde{Z}_1))A_1 + (1 - \mu_2(\tilde{z}_2))A_2)(S + q_2\bar{y}) + K(G_2)
\end{align*}
\]

(14) (15)

Note the following important difference between the equilibria in Figures 1 and 2. In Figure 2, but not in Figure 1, there are city 1 A’s, endowed with \( z \in [\tilde{z}_2, \tilde{z}_1] \), who are working in 1 but actually preferring to receive welfare in 2. These city 1 A’s – endowed with \( z \in [\tilde{z}_2, \tilde{z}_1] \) and working in 1 – we label as tempted A’s. Tempted A’s are held back by the restriction that moves from employment in one city into unemployment in the other city are not permitted.

Earlier\(^ {11}\) we suggested that not imposing this restriction should be inconsistent with the principles of Germany’s “Sozialhilfe”. Inspection of Figure 2 illustrates why. By initially opting for working in 1 rather than for receiving welfare in 1, tempted A’s reveal being better off when working – in 1 – than when receiving welfare – in 1. If moving into 2, tempted A’s deliberately and, since none of the economy’s parameters have changed, needlessly move into a position where they are worse off when working – in 2 – than when receiving welfare – in 2. But then, following the provisions of the law governing “Sozialhilfe”, these households may be held liable for, and hence

\(^{10}\)In Figure 2, for example, welfare migrants are city 1 A’s endowed with \( z \in [\tilde{z}_1, \pi] \). Note that in our setup, as in most of the literature following Wildasin (1991), the city suffering from welfare recipient immigration may not discriminate against non-native welfare recipients, e.g., by giving lower (cash or in-kind) transfers.

\(^{11}\)I.e., in our discussion of feasible moves in section 2.1.
may eventually have to reimburse, any welfare payments received in $2^{12}$. We conclude that \textit{de facto} tempted A's cannot move into welfare in 2.

To find how large the class of tempted A's is replace $V_i^A(q_i, w_i - \tilde{z}, G_i)$ by $V_i^B(q_i, w_i, G_i) - \tilde{z}_i$ in (7) and (8). Then, using (9) and subtracting one of the two resulting equations from the other gives

$$\tilde{z}_1 - \tilde{z}_2 = V_2^W(G_2) - V_1^W(G_1)$$

(16)

The larger is the variation in welfare recipient utility generated by SIHS, the larger is the interval $[\tilde{z}_2, \tilde{z}_1]$. But second, of course, whether all city 1 A’s with cost-of-effort in this interval are actually tempted to move to 2 depends on whether they still live in 1. Assume that $\tilde{Z}_1 = \tilde{z}_2$, as in Figure 1. Then there are no tempted A’s. Alternatively, assume that $\tilde{Z}_1 = \tilde{z}_1$, as in Figure 2. Then the class of tempted A’s is as large as it possibly can be. Finally, intermediate cases are captured by $\tilde{z}_2 < \tilde{Z}_1 < \tilde{z}_1$.

Clearly, the adequate point of departure must take into account the economy’s history. We summarize tempted A’s’ individual behavior over time as follows. Let $\tilde{Z}_1$ denote the current, and $\tilde{Z}_1(-1)$ the previous, period’s split of city 1 A’s. Also, let $\tilde{z}_1$ denote the current period’s marginal cost-of-effort. Then, on the one hand, $\tilde{Z}_1 \leq \tilde{z}_1$ according to (12). On the other hand, $\tilde{Z}_1 \leq \tilde{Z}_1(-1)$. $\tilde{Z}_1$ can never recover beyond $\tilde{Z}_1(-1)$ because once city 1 A’s are in 2 they are lost for good. Jointly the two inequalities imply $\tilde{Z}_1 \leq \min \{\tilde{Z}_1(-1), \tilde{z}_1\}$. Finally, note that we cannot at the same time have $\tilde{Z}_1 < \tilde{Z}_1(-1)$ and $\tilde{Z}_1 < \tilde{z}_1$. (If we had, there would be city 1 A’s in 2 endowed with cost-of-effort below $\tilde{z}_1$ who, having worked in 1 in the previous period, have moved into welfare in 2 only during the current period – in contradiction to our assumption that such a move is not permitted.) Thus

$$\hat{Z}_1 = \min \{\tilde{Z}_1(-1), \tilde{z}_1\}$$

(17)

This is the model’s dynamic equation.

\footnote{According to §92a BSHG (Bundessozialhilfegesetz) “Anyone is obliged to reimburse the costs of ‘Sozialhilfe’ who ..., by deliberate or negligent behavior, has made herself/himself qualify for ‘Sozialhilfe.’” (Author’s translation) – Note that identifying a tempted A in principle should not be difficult for local government in 2 – given his being native to 1 and having a record of recent employment in 1.}
4. Hysteresis – An Illustration in Partial Equilibrium

Even before completing the specification of the general equilibrium model (in section 5) we can illustrate the paper’s theme: that a transitory negative shock may cause a permanent increase in aggregate welfare recipient numbers. – We assume that the initial equilibrium upset by this shock has the following properties: First, it is ”partial” in that \( q_1 \) is assumed fixed. Then \( V^B_1(q_1, w_1, G_1) \), only possibly varying with exogenous \( w_1 \), is exogenous. City 1 is a utility taker, and so is, via (9), city 2. Second, initial equilibrium satisfies the other two conditions of spatial and occupational equilibrium (12) and (13). Third, we assume that \( \tilde{Z}_1 = \tilde{z}_1 \). Then the initial equilibrium is as drawn in Figure 2. (We comment on the shock’s impact on initial equilibria for which \( \tilde{z}_2 \leq \tilde{Z}_1 < \tilde{z}_1 \) below.)

Let B’s’ utility from working \( V^B \) (defined above, see (9)) fall by a small amount at the end of the first period, remain at the resulting lower level in the second period, and return to its initial level in the third period\(^{13} \). To identify different periods, we index the variables’ values in period \( i \) by using \( i \) primes. In terms of Figure 3, then, at the end of the first period \( V^B \) falls to \( (V^B)'' < (V^B)' \). This is a downward shift of the \( (V^B - z) \)-schedule. Both, \( \tilde{z}_1 \) and \( \tilde{z}_2 \), fall. The recession’s immediate impact is to make additional A’s turn to welfare in both cities. In \( i \) these are A’s native to \( i \) and with \( z \in [\tilde{z}'_i, \tilde{z}_i] \).

Recession lasts for one, the second, period. With working A’s’ utility lingering at \( (V^B)'' - z \), newly unemployed city 2 A’s with \( z \in [\tilde{z}''_2, \tilde{z}'_2] \) stay unemployed in 2. But newly unemployed city 1 A’s with \( z \in [\tilde{z}''_1, \tilde{z}'_1] \) happily seize the opportunity of moving into unemployment in 2. Recession, in effect, sets some of precisely those city 1 A’s free to move into welfare in 2 who were tempted to, but constrained not to, move even before the shock.

In the third period \( (V^B) - z \) returns to its initial level: \( (V^B)''' = (V^B)' \) (see Figure 4). All newly unemployed city 2 A’s with \( z \in [\tilde{z}''_2, \tilde{z}'_2] \) return to work in 2. Not so newly unemployed city 1 A’s, with \( z \in [\tilde{z}''_1, \tilde{z}'_1] \) and receiving welfare in 2 ever since the second period. They would be worse off if they chose to become welfare recipients in 1, but also if they began to work in 1 or 2. Thus they decide to remain unemployed in 2 - while they would have

\(^{13}\)This could happen because either \( w_1 \), or \( w_2 \), or both fall by a small amount. Also see section 5.
chosen to return to work had SIHS never "incited" and had the recession never "enabled" them to move to 2. What we observe is a ratchet effect.

**FIGURE 4**

In Figure 4, the thick lines indicate the supports of the two c.d.f.’s as they are observed in period 3. Comparing supports in Figure 4 with those in Figure 2 reveals the recession’s permanent effects. While before the shock $\hat{Z}_1' = \tilde{z}_1'$, after the shock $\hat{Z}_1'' = \tilde{z}_1'' < \tilde{z}_1'$. City 1’s ensuing loss of population and employment equals $[\mu_1(\tilde{z}_1') - \mu_1(\tilde{z}_1'')]A_1$. Obviously, in our two city model city 1’s population loss translates into an equal-sized population gain in city 2. Not so obviously, however, the decrease in city 1’s employment translates into an equal-sized increase in city 2’s welfare recipients. This increase, too, is equal to $[\mu_1(\tilde{z}_1') - \mu_1(\tilde{z}_1'')]A_1$. From the overall economy’s perspective, there is a permanent increase in aggregate welfare recipient numbers. Ultimately, hysteresis occurs if there are tempted A’s who succeed in switching location and occupation during recession. If initially there are no tempted A’s ($\hat{Z}_1' = \tilde{z}_1'$), then there is no hysteresis at all. If initially there are ”many” tempted A’s ($\hat{Z}_1' = \tilde{z}_1'$), as in the scenario just analyzed, then hysteresis is manifest.

To be sure, this section’s illustration suffers from the following caveat. Assume $\hat{Z}_1 = \tilde{z}_1$ initially. True, the economy’s moving restriction prevents tempted A’s from becoming welfare recipients in 2 by a ”direct” combined move. However, tempted A’s might try circumventing ”Sozialhilfe”-provisions by making an ”indirect” combined move. For instance, they might try becoming welfare recipients in 1 first and moving on into welfare in 2 next. In this section’s context, landlords in 1 have no incentive to limit access to welfare in 1, knowing that any welfare recipient in 1 subsequently moves to 2 anyway. But then the equilibrium prior to recession should feature $\hat{Z}_1 = \tilde{z}_2$, rather than $\hat{Z}_1 = \tilde{z}_1$. This, in turn, implies that a recession would never meet, let alone set free, any tempted A’s.

In the following section’s complete model we address this caveat – while hysteresis continues to be a possible attribute of a transitory recession. Local governments in both cities will not just be interested in enforcing the restriction on moving from employment in 1 into welfare in 2. Also, they will comply to prevent tempted A’s’ circumventing this restriction.
5. General Equilibrium
5.1 Spatial, Occupational, and Market Equilibrium

There is a total number of $B_1 + B_2$ B’s in the economy. Let $L_i$ denote the actual number of B’s working in $i$. Then the population constraint is

$$B_1 + B_2 = L_1 + L_2$$

(18)

Next, in 1, housing market equilibrium requires:

$$[\mu_1(\hat{Z}_1)A_1 + L_1 + C_1]\hat{y}_1 = C_1$$

(19)

while housing market equilibrium in 2 is where\(^14\):

$$[\mu_2(\hat{Z}_2)A_2 + L_2 + C_2]\hat{y}_2 + [(1 - \mu_1(\hat{Z}_1))A_1 + (1 - \mu_2(\hat{Z}_2))A_2]\hat{y} = C_2$$

(20)

We define the employed population in city 1 as $E_1 = C_1 + L_1 + \mu_1(\hat{Z}_1)A_1$, and the employed population in city 2 as $E_2 = C_2 + L_2 + \mu_2(\hat{Z}_2)A_2$. Also, we define $\varepsilon_i$ as the elasticity of household demand for housing in $i$ with respect to rent in $i$, i.e., $\varepsilon_i = \left(\frac{d\tilde{y}_i}{dq_i}\right)\left(q_i/\tilde{y}_i\right)$, where $\varepsilon_i < 0$.

General equilibrium not just satisfies the conditions of “occupational and spatial equilibrium” (9), (13), and (17).\(^15\) Also, it respects the “population constraint” (18), and satisfies the conditions for “housing market equilibrium” (19) and (20). – As in the previous section’s discussion of partial equilibrium we will focus on the case where initially there are tempted A’s that may be dislocated by recession. Specifically, $\hat{Z}_1 = \hat{z}_1$. Also, naturally we assume that no shocks have occurred in the period prior to the recession to be analyzed. Hence, $\hat{Z}_1 = \hat{Z}_1(-1)$.

We represent general equilibrium by two equilibrium loci in $(\hat{z}_1, \hat{Z}_1)$-space. The first locus depicts the dependence of $\hat{Z}_1$ on $\hat{z}_1$. This is simply (17). Briefly, $\hat{Z}_1 = \hat{Z}_1(\hat{z}_1, \hat{Z}_1(-1))$. In Figure 5, this is the kinked graph. – The

\(^{14}\)Here we already make use of $\hat{z}_2 = \hat{Z}_2$, from (13).

\(^{15}\)Here (17) replaces the second inequality in (12). Moreover, we ignore the first inequality in (12) because we will focus on small changes in the vicinity of the allocation $(\hat{Z}_1, \hat{Z}_2) = (\hat{z}_1, \hat{z}_2)$; see below.
second locus depicts the dependence of $\tilde{z}_1$ on $\hat{Z}_1$ and follows from implicitly solving (7), (8), (9), (13), (18), (19), and (20) for $\tilde{z}_1$ as a function of $\hat{Z}_1, w_1$ and $w_2$. Briefly, $\tilde{z}_1 = \tilde{z}_1(\hat{Z}_1, w_1, w_2)$. We derive this locus’ slope as well as its response to changes in wages in Appendix 2. The solution for $d\tilde{z}_1$ is

$$d\tilde{z}_1 = \frac{\alpha_2 dw_1 + \alpha_1 dw_2 + \alpha_1 \alpha_2 (1 - \frac{y}{y'}) A_1 \mu_1 d\hat{Z}_1}{\alpha_1 + \alpha_2 - \alpha_1 \alpha_2 (1 - \frac{y}{y'}) A_2 \mu_2}$$

(21)

where $\alpha_i = (q_i y_i) / (\varepsilon_i E_i) < 0$. Clearly, $(d\tilde{z}_1/d\hat{Z}_1) < 0$. The $\tilde{z}_1(\hat{Z}_1, w_1, w_2)$–locus is downward-sloping, and so it is graphed in Figure 5. – Clearly, also, $(d\tilde{z}_1/dw_1), (d\tilde{z}_1/dw_2) > 0$. – General equilibrium, at last, is where the two loci intersect. FIGURE 5

### 5.2 Local Government Incentives

We show that landlords in both cities must be interested in preventing not just any ”direct combined move” from employment in 1 into welfare in 2, but also any ”indirect combined move”. Consider tempted A’s with $z$ slightly smaller than $\tilde{z}_1$. Assume that these A’s could directly move from employment in 1 into welfare in 2; or, that they could enter welfare in 1 first and, shortly after, leave for welfare in 2 next; or, that they move into employment in 2 first, and, shortly after, could enter welfare in 2 next. All three types of withdrawal we model as a small reduction in the pre-recession value of city 1’s employment split: $d[\hat{Z}_1(-1)] < 0$.

Given $\hat{Z}_1 = \hat{Z}_1(-1), \hat{Z}_1 = \tilde{z}_1$, and (17), this implies $d\hat{Z}_1 = d[\hat{Z}_1(-1)] < 0$. According to (21), then $d\tilde{z}_1 > 0$. Next, from differentiating (16) $d\tilde{z}_2 = d\tilde{z}_1$. Hence $d\tilde{z}_2 > 0$, too. Finally, differentiating (7) and (8), and using $dw_1 = dw_2 = 0$, implies $dq_1 < 0$ and $dq_2 < 0$, respectively. Emigration of tempted A’s reduces rents in both cities. Differentiating a representative city 1 landlord’s indirect utility yields $dV^C_1 = (1 - \tilde{y}_1) dq_1$, given that $t_1$ is effectively fixed (see (14)). But then $dV^C_1 < 0$. Landlords in 1 are unambiguously worse off. Next, as shown in Appendix 3, so are landlords in 2.

Hence, not just does the law underlying ”Sozialhilfe” rule out any direct move from employment in 1 into welfare in 2. Also, local governments in both

---

16 Note that, using (19), $\tilde{y}_1 < 1$. 
cities will be against such a move. Moreover, both local governments will be interested in preventing any indirect combined move from employment in 1 into welfare in 2. Will they succeed? Note that the direct combined move as well as the two indirect combined moves always involve entry into welfare at some stage – either in 1 or in 2. A simple and effective rule to identify tempted A’s on their way into welfare in 2 (outside recession) may be based on city of origin as well as observable employment record and is as follows: (i) Local government in 1 denies welfare to city 1 A’s having worked in 1 prior to applying for welfare in 1. (ii) Local government in 2 denies welfare to city 1 A’s having worked in 1 or 2 prior to applying for welfare in 2. To summarize, an allocation exhibiting \( \hat{Z}_1 = \tilde{z}_1 \) is an equilibrium.

5.3 Hysteresis in General Equilibrium

The following discussion of hysteresis parallels that in section 4. Again we analyze three periods, indexing variables’ equilibrium values in period \( i \) by \( i \) primes. The only addition in notation reflects the need to address the value of \( \hat{Z}_1 \) in the period preceding period 1; this period ”0” is marked by attaching superscript \(^0\). – At the end of the first period a recession hits 1. In Figure 6, this is a drop in \( w_1 \) from \( w'_1 \) to \( w''_1 \). The \( \tilde{z}_1(\hat{Z}_1, w_1, w_2) \)–locus shifts to the left. Marginal cost-of-effort falls

During recession, in period 2, the split of city 1 A’s falls to \( \hat{Z}''_1 \), as newly unemployed city 1 A’s move into unemployment in 2. In period 3, \( w_1 \) rises from \( w''_1 \) to \( w'''_1 \), putting an end to recession. This would carry the economy to the equilibrium before the shock - if the underlying spatial allocation of disadvantaged households had not changed. However, as Figure 7 shows, in the third period the initial equilibrium locus \( \hat{Z}_1(\tilde{z}_1, \tilde{Z}_1) \) no longer is relevant. With city 1’s split permanently fallen to \( \hat{Z}''_1 < \hat{Z}_1^0 \) since the second period, the relevant third period equilibrium locus is \( \hat{Z}_1(\tilde{z}_1, \hat{Z}'_1) \). Population and employment in 1 permanently fall. By the same token, population and welfare recipients in 2 permanently rise. And, most importantly, so does the aggregate number of welfare recipients in the economy. FIGURE 7

\(^{17}\)Alternatively, one would presume that local governments who would suffer from tempted A’s’ migration into welfare in 2 will invest into learning about applicants’ \( z \).  
\(^{18}\)Note that Figure 3 supplements Figure 6’s description of the initial equilibrium, as well as of the effect of the shock. For instance, \( \tilde{z}_1' \) in Figure 3 equals \( \tilde{z}_1' \) in Figure 6, etc. Also note that the discussion of an exogenous drop in \( w_2 \) (another regional shock), or of a simultaneous drop in \( w_1 \) and \( w_2 \) (a macroeconomic shock), is similar.  
\(^{19}\)In Figure 7, we assume that \( w_1 \) sufficiently rises to shift the \( \tilde{z}_1(\hat{Z}_1, w_1, w_2) \)-locus back into its initial position. This is not necessary for the argument.
6. Conclusions

Germany’s aggregate welfare recipient numbers have kept rising during the last three decades. This paper suggests that spatial reallocation of disadvantaged households towards cities with higher reservation utility may have played a role, too. In the model, oddly, there are disadvantaged households working in their native bad-amenity city who would be better off receiving welfare in a good-amenity-city. These households "lean against the good-amenity-city's door". As long as they do sufficiently well when working in their native bad-amenity city, this door is shut. However, as soon as they do less well when working in their native city because of recession, the door opens. Then these "tempted households" move into welfare in the good-amenity city to never come back – not even when the economy swings back. This is the model’s ratchet effect.

We emphasize that hysteresis in welfare carries over to hysteresis in other social phenomena, too. First, hysteresis in welfare predicts a permanent impact on local governments’ budgets, given German local governments’ close-to-exclusive responsibility for welfare payments. Moreover, if amenity quality is positively correlated with city size, then the paper might also help explain large German cities’ growing fiscal problems, as documented in Seitz/ Kurz (1999) and, in the case of Berlin, Hamburg and Bremen, in Riphahn (2001). Second, our explanation of hysteresis in welfare can also be shown to predict growing and persistent spatial segregation between disadvantaged and not-disadvantaged households.

To conclude, we emphasize that changes in "Sozialhilfe"’s design may disrupt the reallocation of disadvantaged households during recession suggested by the model. For instance, assume that the good-amenity-city could tie "Sozialhilfe"-payments to an obligation to work. Then, under such a work-fare program, its appeal to "tempted households" would suffer. Or, assume that it would not just be possible, but also desirable, to replace the current mix of cash grant cum housing subsidy with a single cash transfer; and that this transfer were equal to the minimum expenditure necessary, at given local amenity and rent, to attain a pre-defined level of utility from receiving welfare. Then welfare recipient utility in a good amenity city would not be higher than elsewhere. "Sozialhilfe"’s design is crucial for allowing hysteresis to happen. Ultimately, the paper’s model is yet another demonstration of the interaction between a transitory recession and a society’s institutions.
Appendix 1:

\((\hat{Z}_1, \hat{Z}_2)\) is an equilibrium allocation of A’s \(\iff\) Eq. (9), (12) and (13) hold.

"If": We check the different subgroups of A’s one by one. Employed City 2 A’s: Given (13), all \(\mu_2(\hat{Z}_2)A_2\) city 2 A’s working in 2 exhibit cost-of-effort not above \(\hat{z}_2\). They will not want to be unemployed in 2. Given (9), and hence (11), they have no incentive to move into work in 1. Employed City 1 A’s: Given the second inequality in (12), all \(\mu_1(\hat{Z}_1)A_1\) city 1 A’s working in 1 exhibit cost-of-effort not above \(\hat{z}_1\). Hence they will not want to be unemployed in 1. Given (9), and hence (11), they have no incentive to move into work in 2. Unemployed City 2 A’s: Given (13), all \((1-\mu_2(\hat{Z}_2))A_2\) city 2 A’s receiving welfare in 2 exhibit cost-of-effort not below \(\hat{z}_2\). They will not want to be employed in 2. Given (9), and hence (11), they will not want to be employed in 1 either. And given higher welfare recipient utility in 2 than in 1, according to (6), they will not want to be unemployed in 1. Unemployed City 1 A’s: Given the first inequality in (12), all \((1-\mu_1(\hat{Z}_1))A_1\) city 1 A’s receiving welfare in 2 exhibit cost-of-effort not below \(\hat{z}_2\). Hence they will not want to be employed in 2. Given (9) and hence (11), they will not want to be employed in 1 either. And given higher welfare recipient utility in 2 than in 1, they will not want to be unemployed in 1.

"Only If": Assume that \(\hat{Z}_1 > \hat{z}_1\). Then there would be city 1 A’s working in 1 even though they would prefer to receive welfare in 1. Next, assume that \(\hat{Z}_1 < \hat{z}_2\). Then there would be city 1 A’s receiving welfare in 2 who would prefer to work in 2. Similarly, \(\hat{Z}_2 \neq \hat{z}_2\) violates equilibrium, too. Finally, assume that (9) does not hold. Then (11) cannot hold either. Migration could make some working A’s better off.

Appendix 2:

Totally differentiating (19) gives

\[-\hat{y}_1 dq_1 = \frac{q_1}{\varepsilon_1} \frac{\hat{y}_1}{E_1} \left[ A_1\mu_1 z \hat{Z}_1 + dL_1 \right] \tag{22}\]

Next, differentiating (20) and replacing \(dL_2\) with \(-dL_1\) by virtue of (18) gives

\[\hat{y}_2 dq_2 = \frac{q_2}{\varepsilon_2} \frac{\hat{y}_2}{E_2} \left[ A_2\mu_2 z (\frac{\hat{y}}{\hat{y}_2} - 1) d\hat{z}_2 + A_1\mu_1 z \frac{\hat{y}}{\hat{y}_2} d\hat{Z}_1 + dL_1 \right] \tag{23}\]
For shorter notation, we define $\alpha_i = (q_i\tilde{y}_i)/(\epsilon_i E_i)$, where $\alpha_i < 0^{20}$. Totally differentiating (9) gives

$$-\tilde{y}_1 dq_1 + dw_1 = -\tilde{y}_2 dq_2 + dw_2 \quad (24)$$

Substituting (22) and (23) into (24), and rearranging, yields B’s’ migration $dL_1$ in response to wage shocks and changes in $\tilde{z}_2$ and $\hat{Z}_1$. Substituting the resulting expression back into either the l.h.s. or the r.h.s. of (24) yields

$$dV^B = \left(\frac{\alpha_2}{\alpha_1 + \alpha_2}\right) \left[ dw_1 + \alpha_1 \left(1 - \frac{\tilde{y}}{\tilde{y}_2}\right) A_2 \mu_2 d\tilde{z}_2 \right]$$

$$+ \left(\frac{\alpha_1}{\alpha_1 + \alpha_2}\right) \left[ dw_2 + \alpha_2 \left(1 - \frac{\tilde{y}}{\tilde{y}_2}\right) A_1 \mu_1 d\hat{Z}_1 \right] \quad (25)$$

Finally, totally differentiating (8) gives $dV^C_2 = 0 \Rightarrow dV^B = d\tilde{z}_2$. Totally differentiating (16) gives $d\tilde{z}_2 = d\tilde{z}_1$. Hence, $dV^B = d\tilde{z}_1 = d\tilde{z}_2$. Using this in (25) and rearranging yields (21).

**Appendix 3:**

To determine the change in $V^C_2$ we first calculate the change in $t_2$. Totally differentiating (16) gives $d\tilde{z}_2 = d\tilde{z}_1$. Totally differentiating (15), replacing $d\tilde{z}_2$ by $d\tilde{z}_1$, and $d\tilde{z}_1$ by the r.h.s. of (21) (where, of course, $dw_1 = dw_2 = 0$), and rearranging gives

$$dt_2 = \frac{1}{C_2} \left[ U_2 \tilde{y} dq_2 + (S + \tilde{y} q_2) \left(-\frac{A_1 \mu_1 \alpha_2}{\alpha_1 + \alpha_2 - \alpha_1 \alpha_2 (1 - \frac{\tilde{y}}{\tilde{y}_2}) A_2 \mu_2} \right) d\hat{Z}_1 \right] \quad (26)$$

where $U_2 = [(1 - \mu_1(\hat{Z}_1))A_1 + (1 - \mu_2(\tilde{z}_2))A_2]$ is the number of welfare recipients in 2. Next, the change in city 2 landlords’ utility is

$$dV^C_2 = (1 - \tilde{y}_2) dq_2 - dt_2 \quad (27)$$

Inserting (26), and making use of (20), $dq_2 < 0$ and $d\hat{Z}_1 < 0$, eventually gives $dV^C_2 < 0$. This confirms the intuitive idea that immigration of welfare recipients must make city 2 landlords worse off.

---

20Wages have no role in determining rents because housing demand is independent of income; see (3).
Figure 1: Spatial and Occupational Equilibrium where \((\hat{Z}_1, \hat{Z}_2) = (\bar{z}_2, \bar{z}_2)\)
Figure 2: Spatial and Occupational Equilibrium where \((\hat{Z}_1, \hat{Z}_2) = (\tilde{z}_1, \tilde{z}_2)\)
Figure 3: An Illustration of Recession
\( (V^B)^m - z = (V^B)' - z \)

Figure 4: An Illustration of Hysteresis
Figure 5: General Equilibrium
Figure 6: Recession ($w''_1 < w'_1$)
Figure 7: Hysteresis
References


Leibfried, St. et al. (1995), Zeit der Armut, Suhrkamp.


