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Abstract:

This paper indicates that East Germany's unemployment originates primarily in the labor market, caused by the fast wage adjustment after German reunification. We model the resulting labor market traps in a search and matching framework, show that they are difficult to overcome, and provide empirical evidence. We argue that under these circumstances, demand-side policies are effective mainly when they increase the economy's overall productivity and thereby help overcome the labor market traps.

Keywords: unemployment, labor market trap, East Germany

JEL classification: E24, J30, J64, P2

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1. Introduction

In Snower and Merkl (2006) we highlight the role of labor market institutions for the bad performance of the East German labor market. Immediately after German reunification, East German wage bargaining was conducted primarily by West German unions and employers, and these had strong incentives to push East German wages up, in order to reduce migration of East German workers to West Germany and of West German firms to the East. Given the low short-run elasticity of labor demand, this "bargaining by proxy" was not only in the interests of West German unions, but also West German firms who feared the entry of new firms. The upward wage pressure was reinforced through generous unemployment benefits and associated welfare entitlements. The resulting East German wage hike led to a sharp fall in East German employment, and this effect was prolonged through the introduction of generous job security provisions and costly hiring regulations, which raised the persistence of employment (i.e. made current employment depend more heavily on past employment).

In a reaction to our paper, Hall and Ludwig (2007) deem these labor market policy mistakes as "at best secondary." Instead, they claim that the real source of East Germany's high unemployment lies outside the labor market: it is to be found mainly in the product market. Thus they consider the workings of labor market largely irrelevant to the unemployment problem. In particular, they believe that a misguided privatization process was the real core of the problem. They allege that a more efficient way of privatizing state property, combined with a greater aggregate demand stimulus, achieved through Keynesian pump priming, could have brought East German unemployment down to acceptable levels.

This argument is important since it has far-reaching policy implications. Whereas the privatization process is clearly a by-gone, the option of Keynesian demand management

stimulus in East Germany remains open. In this paper, we argue that pursuing this option would be seriously inappropriate. We maintain that the "irrelevant labor market" is a myth. Labor market reforms are one of the most important instruments to overcome the East German unemployment problem.

In essence, our argument is that East German unemployment arose because East German wages adjusted much faster than East German productivity to their West German counterparts. The persistence of unemployment (due to labor market institutions) caused the East German labor market to fall into various "traps" (elaborated below). These traps prevented the labor market from recovering once East German wages gradually declined relative to productivity in the decade following reunification.

We agree with Hall and Ludwig (2007) that an inefficient privatization process contributed to East Germany's unemployment problem, but we also maintain that this contribution is tied to East Germany's dysfunctional wage adjustment path. Specifically, had East German wages adjusted more slowly to the West German levels, the privatization process would have done less damage to the East German labor market. In practice, the inefficient privatization dampened East German productivity, so that East German efficiency wages (real wages divided by productivity) were even higher than they would otherwise have been. It is these excessive efficiency wages that generated the large exodus of East German workers into the unemployment pool.

We disagree with Hall and Ludwig (2007) that even stronger Keynesian demand stimuli could have tamed East German unemployment. As it was, East Germany after reunification received what was perhaps the largest aggregate demand stimulus of the postwar period. Although more than € 1 trillion (about $ 1.5 trillion) in transfers have flown from West Germany to East

Germany since unification and although about one quarter of the current East German demand is financed by West German transfers (see Lehmann, Ludwig and Ragnitz, 2005), the East German region continues to have a huge unemployment problem, massive outward migration, a substantial productivity gap and no GDP growth convergence to the West.

The rest of the paper is structured as follows: Section 2 presents evidence for the massive wage increases in East Germany and briefly discusses the connection with the privatization process. Section 3 provides an explanation for labor market traps. Section 4 shows that our conclusion, which we derived in Snower and Merkl (2006), would also hold in the context of a New Keynesian general equilibrium setting. Furthermore, it discusses potential policy solutions to reduce the unemployment in East Germany. Section 5 concludes.

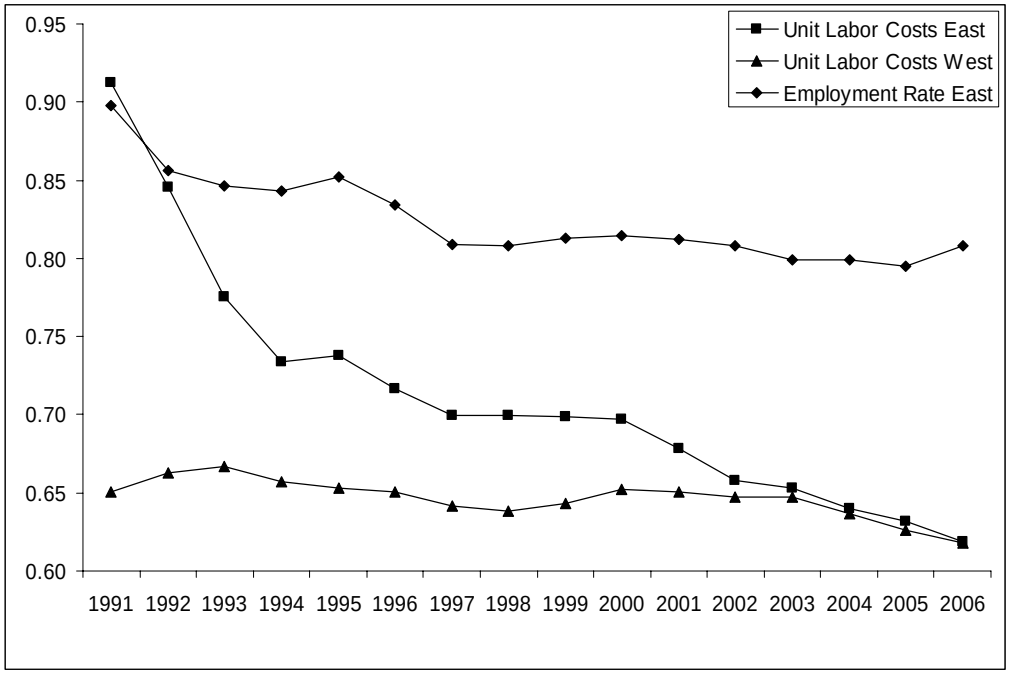
2. The Role of the Wage Adjustment

Figure 1 shows that unit labor costs (wages divided by productivity) were relatively high at the beginning of the nineties and have steadily declined since then because the influence of West German "bargaining by proxy" has declined as East German workers and firms have gradually taken wage bargaining into their own hands. Although the unit labor costs have recently dropped to levels similar to the West German ones, the East German labor market has not recovered from the unemployment problem. We will show in Section 3 that the wrong sequencing of decisions (a fast wage adjustment followed by a somewhat slower productivity adjustment) led to labor market traps which are difficult to overcome.

By contrast, Hall and Ludwig (2007) stress that the privatization process was central to the East German unemployment problem. We agree that the privatization was surely not performed well. However, Hall and Ludwig (2007) ignore that the inefficient privatization

policy stood in close connection to the fast wage adjustment. Only firms that adjusted their productivity quickly were able to survive the massive cost pressure, which was induced by the 1:1 exchange rate and the subsequent quick wage adjustment.

Figure 1: *Employment and Unit Labor Costs*[1]



The quick wage adjustment policy made many of the former East German assets unprofitable and devalued their capital stock to zero. The wage adjustment was combined with a quick privatization and a high technology strategy. Had the real wages[2] been adjusted more slowly, there would have been better opportunities to maintain more of the productive assets, to increase the overall aggregate productivity and thus to keep the labor force participation at a higher level. Most importantly, as argued below, East Germany would have been less prone to fall into its labor market traps.

[1] Sources: Statistische Ämter des Bundes und der Länder (2005, 2007), Bundesagentur für Arbeit (2006, 2008), own calculations. The employment rate is defined as 1-unemployment rate. It is based on dependently employed workers (i.e., self-employed workers are excluded). Note that there is a statistical break in the data between 2004 and 2005.

[2] Real wages take exchange rate effects between the East and West German currencies into account.

3. Why the Wrong Sequencing Has Long-Lasting Aftereffects

Hall and Ludwig (2007, p. 604 f.) write: "Admittedly, policies that contribute to labor market distortions are to be found in eastern Germany. We should, however, like to note that these, similar, and other policies—thought to cause labor market distortions fettering competition—are also found in western Germany, and most European economies (…) What, then, accounts for eastern Germany's "exceptionalism"?"

In this section, we show why the decision to increase wages first and to let productivity follow later on (once the capital stock has adjusted to the West German level) accounts exactly for this exceptionalism. Thus, the wrong policies at the beginning of the nineties have long-lasting or even permanent aftereffects, as labor market traps were created.

We suggest that these phenomena have arisen because East German labor force participants fell into "traps," concerning low skills, aging of the workforce, labor-saving capital and skills, capital underutilization, and unemployment arising from the decline of the tradable sector. These traps were all promoted by the "caring hand" of the West. In Snower and Merkl (2006) an intuitive discussion of these traps can be found. In what follows, we now provide an analytical framework for explaining these traps.

a) Skills and Vacancies

To make sense of labor market traps, we focus on the interaction between workers' skills acquisition decisions and firms' vacancy decisions. For simplicity, we separate the economy into an employment creating sector (EC) and an employment destroying sector (ED). Suppose that the two sectors require sector-specific skills. Workers decide what skills to acquire,

taking account of what types of jobs are available; and firms offer jobs, taking account of what skills are available.

The intuition underlying our "traps" is simple. The rise in Eastern wages after reunification gave firms an incentive to offer more jobs in ED and less in EC. Thereby Eastern workers gained an incentive to invest in ED skills (or not to invest in skills at all, as in the low-skill trap). This interaction between workers' skill decisions and firms' vacancy decisions amplify the initial effect of the Eastern wage hike. The resulting preponderance of ED skills becomes "sticky" due to the fixed costs of skill acquisition (e.g., vocational and further education). Since such human capital investment is typically costly and lengthy, the resulting skills decisions can be undone only by an employment-creating shock (e.g., a fall in wages) that is sufficiently large to exceed the fixed costs of skill acquisition. We argue, however, that such a large shock did not occur due to the social and institutional union, which bolstered firing costs, unemployment benefits and other welfare entitlements and thereby maintained firms' incentives to economize on labor and reduced workers' incentives to seek jobs. Thus the East German labor market is in a trap, where the nature of skills and vacancies perpetuate a low-employment equilibrium.

While it is straightforward to extend our model to cover skill acquisition, for brevity we simplify the analysis to focus solely on the interaction between skills and vacancies.

b) The Skill Acquisition Decision

Let the worker's gain from acquiring skills be $\rho_i w_i - (1-\rho_i) b_i$, where ρ_i is the probability of finding a job in sector $i = EC, ED$, w is the wage and b are the unemployment benefits.[3] The

[3] For simplicity, but without affecting our qualitative conclusions, we assume that workers and firms have a one-period time horizon.

number of matches (X_i) in each market depends on the number of searchers (M_i) and the number of vacancies (V_i): $X_i = A_i M_i^{\alpha} V_i^{1-\alpha}$.

The searchers M_i for jobs in sector i are the unemployed workers with the skills relevant for that sector. This group is composed of those who were previously employed in this sector and lost their jobs $\left(M_i^o\right)$ and those who have not been employed in this sector but who have acquired the necessary skills previously. The worker's probability of finding a job is $\rho_i = \frac{X_i}{M_i} = A_i\left(\frac{V_i}{M_i}\right)^{1-\alpha}$.

Let the marginal cost of training for a worker without previous training in sector i be τ_i (a positive constant) and and let the corresponding cost for a worker who has previously been employed in the relevant sector be τ_i^o (another positive constant), where $\tau_i > \tau_i^o$.

Since the traps are concerned with misallocations of labor between sectors, we focus on movements of labor from EC to ED or in the opposite direction. In equilibrium, the marginal benefits from skill acquisition are equal to the associated marginal cost. Thus we obtain the following *skills function,* where the relative benefits of acquiring skills are equal to the relative costs across sectors:

$$\frac{V_{ED}}{V_{EC}} = \left(\frac{c_{ED}}{c^0{}_{EC}}\right)^{\frac{1}{1-\alpha}} \frac{M_{ED}}{M_{EC}}, \text{ for } M_{ED} > M^0{}_{ED} \text{ and } M_{EC} \le M^0{}_{EC},$$

$$\frac{V_{ED}}{V_{EC}} = \left(\frac{c^0{}_{ED}}{c_{EC}}\right)^{\frac{1}{1-\alpha}} \frac{M_{ED}}{M_{EC}}, \text{ for } M_{ED} \le M^0{}_{ED} \text{ and } M_{EC} > M^0{}_{EC}, \quad (1)$$

where $c_i = \left(\tau_i + \beta w_i\right)/\left(w_i(1-\beta)A_i\right)$ and $c_i{}^0 = \left(\tau_i{}^0 + \beta w_i\right)/\left(w_i(1-\beta)A_i\right)$, where β is the replacement rate.

c) The Vacancy Decision

The firm's physical capital decision is modeled simply in terms of supplying vacancies in each sector. The expected gross profit per employee (excluding vacancy costs) is $\theta_i(a_i - w_i)$, where θ_i is the firm's probability of finding a worker with the relevant skills. Firms are heterogeneous in terms of their costs of supplying vacancies, so that their marginal firm's cost of supplying vacancies rises with the aggregate number of vacancies supplied: $\kappa_i V_i^{\delta}$, where $\delta > 1$ is a constant. Firms enter each sector until the marginal gross profit is equal to the marginal cost of supplying vacancies: $\theta_i(a_i - w_i) = \kappa_i V_i^{\delta}$. The probability of finding a worker with the relevant skills is $\theta_i = \frac{X_i}{V_i} = A_i\left(\frac{M_i}{V_i}\right)^{\alpha}$.

Thus we obtain the following vacancy function, where the relative benefits of supplying vacancies are equal to the relative costs across sectors:

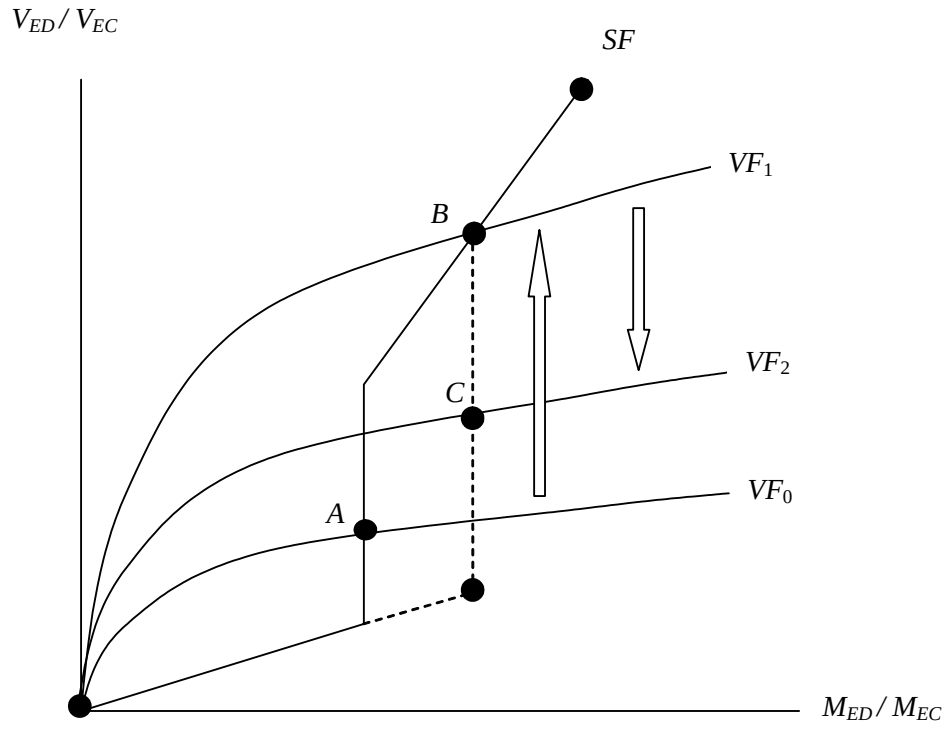
$$\frac{V_{ED}}{V_{EC}} = \left(\frac{d_{EC}}{d_{ED}}\right)^{\frac{1}{\alpha+\delta}} \left(\frac{M_{ED}}{M_{EC}}\right)^{\frac{\alpha}{\alpha+\delta}}, \tag{2}$$

where $d_i = \kappa_i / (A_i(a_i - w_i))$.

d) The Labor Market Equilibrium

The skills function is depicted by SF in Fig. 3. Since $\tau_i > \tau_i^o$, the lower branch of this function is flatter than the upper branch and there is a kink between the two branches. The vacancy function is VF. The labor market equilibrium lies at the intersection of SF and VF.

Figure 2: *Skills and Vacancies*



Starting from a hypothetical initial equilibrium point A, wages rise due to bargaining by proxy.[4] Thus the relative profitability of the ED sector rises, so that the vacancy supply function shifts upwards from VF_0 to VF_1. The new equilibrium is at point B and the corresponding skills function has a kink that passes through point C.

Finally, wages fall back partially (as Easterners gain control over their wages) and the vacancy function shifts down from VF_1 to VF_2. Provided that this shift is smaller than the size of the kink in the skills function, then the relative skill endowment M_s/M_u remains unchanged and the economy remains trapped with the relatively large share of workers with ED skills.

[4] The figure assumes for simplicity that this wage hike hits both sectors proportionately, so that relative wages between the two sectors remain unchanged and SF is unchanged as well.

e) Empirical Evidence for Various Types of Traps

In the theoretical model for simplicity we have represented the different possible traps, by an employment creating and employment destroying sector above. Below, we outline different traps and provide empirical evidence for their existence:[5]

The low-skill trap: Due to generous unemployment benefits, associated welfare entitlements, and job security provisions, wages relative to productivity remained particularly high for East German unskilled workers, who thus became especially unemployment-prone. Without jobs, they could not get on-the-job training and become integrated in the workforce, thus falling into a low-skill unemployment trap.

Evidence: The unemployment rate among people without qualification in East Germany jumped from around 30% in 1991 to more than a half at the end of the nineties (DIW Berlin et al., 2002, p. 342).

The aging trap: Since the younger workers have a longer time horizon over which they earn wage income, to be set against the fixed cost of migrating, the younger East Germans have had a greater incentive to migrate to the West, where expected income is higher. This incentive was reinforced by the post-unification wage hike: since the elasticity of labor demand is smaller in the short run than in the long run, the wage hike raised wage income more in the short run, i.e. the time span relevant to older workers. Insofar as older workers are less flexible and versatile than their younger counterparts, this may lead to less flexible and versatile capital accumulation. Thereby the East became susceptible to an "aging trap" in which old skills and old capital dampened labor productivity and thus labor demand.

Evidence: The empirical literature provides support that young people have a higher propensity to migrate (see e.g. Burda, 1993, Burda et al., 1998, Büchel and Schwarze, 1994,

[5] While Snower and Merkl (2006) give intuitive accounts of the traps, they do not consider the empirical evidence for these traps, as provided below.

Brücker and Trübswetter, 2007). Burda and Hunt (2001) and Jennifer Hunt (2000) write that movers are on average eleven to fifteen years younger than stayers. Further evidence is provided by the Institut für Arbeitsmarkt- und Berufsforschung (2005), which predicts that the potential labor force[6] in East Germany will fall from 10 million today to about 4.5 million people in 2050, whereas the drop in West Germany will be more moderate (from 40 to 30 million people).[7]

The labor-saving trap: Due to the post-unification wage hike and investment subsidies, it became profitable for firms to invest in labor-saving physical capital. Once this capital was in place, it was of course more difficult to find jobs for East Germany's unemployed. Investment in labor-saving capital raised incentives for workers to acquire the associated "labor-saving labor" skills. The resulting equilibrium, "labor-saving capital-skills trap," economizes on labor, despite high unemployment.

Evidence: There is evidence that high wages, coupled with investment subsidies, channeled investment flows heavily into labor saving equipment. This tendency is clearly visible in the manufacturing sector. Gerling (2002) shows that investment into capital intensive sectors had a much larger share in East Germany than in West Germany, whereas the opposite was the case for skilled-labor-intensive sectors (see Table 1). Table 2 shows that the industrial capital intensities in East Germany (defined as the capital stock per worker) were lower than in West Germany during the mid-nineties. However, at the end of the nineties this relationship was reversed.

[6] Defined as number of people in the age group from 15 to 64.

[7] Only a small part of the stronger reduction in East Germany can be explained by the inner German migration. A bigger proportion is due to a more pronounced immigration of foreigners to West Germany (and a lower birth rate in East Germany). We conclude that better long run perspectives render West Germany more attractive.

Table 1*: Structure of investment in the manufacturing sector in East and West Germany according to industry aggregates, 1991-1999, for companies with more than 20 employees. Source: Gerling (2002), p. 41.*

Sectors	East Germany	West Germany
Capital-intensive	60%	45%
Skilled-Labor-intensive	26%	39%
Unskilled-Labor-intensive	14%	16%

Table 2: *Industrial capital intensities. Source: Statistische Ämter des Bundes und der Länder (2005), own calculations.*

Capital Stock / Year	East Germany	West Germany
1995	98	109
1999	125	124
2002	153	132

The "wrong" capital-skills trap: The vast investment subsidies in East Germany generated capital that propped up uncompetitive enterprises and was designed to prevent layoffs in declining industries. Firms had relatively little incentive to avoid underutilization of such capital. This phenomenon provides an explanation for the puzzling phenomenon that labor productivity is generally lower in the East than West, even though capital intensity is comparable or higher. We hypothesize that the "wrong capital" is complementary with "wrong skills", which also tend to be underutilized. The resulting trap helps keep East Germans unemployment-prone and dependent on hand-outs from the West.

Evidence: Sinn (1995) argues that the enormous investment subsidies have created a negative cost of capital in East Germany. Thus, capital was not only a factor of production, but also an economic good. Even if the cost of capital was negative in some cases, on average profitable

projects were chosen. Nevertheless, the return on capital in East Germany was significantly lower in East Germany than in West Germany during the nineties. Quehenberger (2000, p. 127) estimates that on average it was 5% (15%) from 1991 to 1998 in East (West) Germany and 8% (16%) from 1995 to 1998.

Besides generous investment subsidies there are many other institutional reasons for the creation of "wrong" capital: Sinn (1995) writes e.g. that generous depreciation rules were not helpful for founders of new firms, since they usually do not have any other substantial sources of income, which they could use to write-off their losses. Furthermore, much of the East German investment was not flowing into productive assets. Instead it was channeled into private building activity, stimulated by high wages (causing a boost in demand for rental housing) and the investment subsidies (ensuring low production costs), see e.g. Sinn (1995).

The nontradable trap: The massive subsidies from West Germany triggered a rapid rise of product demand in East Germany. Thus the prices of nontradables rose, while tradable prices remained perforce unchanged (while "imports" of tradables from West to East rose). This, combined with wage compression between East and West (due to bargaining by proxy, uniformly generous unemployment benefits and job security provisions), caused real producer wages to rise much faster in the tradable than the nontradable sector. The resulting reallocation of labor towards the nontradable sector led to higher unemployment in the transition. Some of this unemployment persisted since retraining takes time and many unemployed workers remained jobless due to generous unemployment benefits, lack of on-the-job training, and retraining costs.

Evidence: While prices in the service sector (which contains a big part of the non-tradable sector) have risen by almost 50% from 1991 to 2001, the price increase in the manufacturing sector (excluding construction) was only 13%.[8]

Manufacturing comprises a much smaller share of total employment in East Germany than in West Germany or in the Eastern European transition countries (see e.g. Quehenberger, 2000, p. 131).

5. Policy Options

To address the claim of Hall and Ludwig (2007) that the origin of East Germany's unemployment problem lies in markets other than the labor market, we report on recent research in Lechthaler, Merkl and Snower (2008), where we extend our partial equilibrium model to a fully fledged dynamic general equilibrium model in the New Keynesian tradition (see, e.g., Galí (2003) or Woodford (2003)) to analyze the interaction of product and labor market in reaction to monetary policy. The graph below illustrates the structure of the model economy. The dashed lines are the new parts that we have abstracted from in Snower and Merkl (2006).

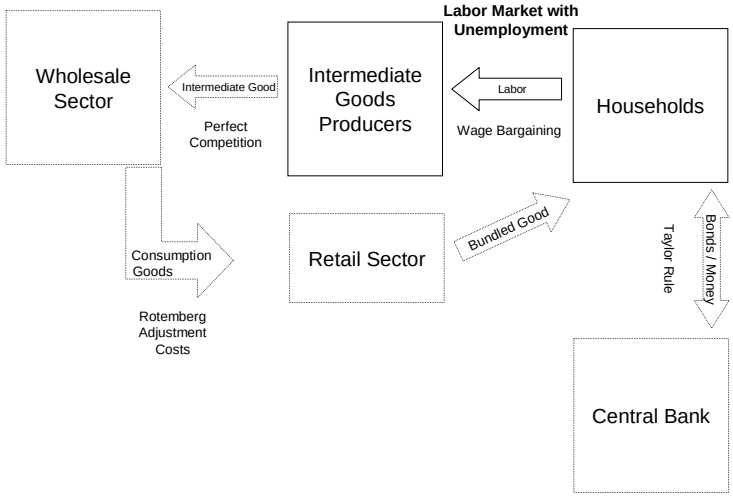
To see whether the accusation by Hall and Ludwig (2007) is justified, we performed several labor policy exercises in this new framework (e.g., a reduction of unemployment benefits or hiring vouchers for unemployed). For a given calibration, the integration of product, bond and money markets changes the speed of adjustment to the new steady state only slightly.[9] However, they do not affect the steady states of the economy, as the economy always adjusts to its natural output and unemployment level (which is mainly determined by labor market institutions). Thus, the conclusions we draw from our partial equilibrium model would be the

[8] Source: Statistisches Bundesamt (2005).

[9] The exact adjustment speed depends on the way the demand side (i.e. the conduct of monetary policy) is specified. The reaction of the central bank can either lead to a faster or slower speed of adjustment.

same in a general equilibrium setting. The omission of the other markets does not lead to any significantly biased results.

Figure 3: Stylized Model Structure[10]



In Merkl and Snower (2007) we model the low skill trap, by separating the economy into a primary sector with high qualified workers and a trapped sector with workers who have been unemployed for a while and thus depreciated their human capital. In context of this model we analyze the effects of different labor market policies which face very different trade-offs. A reduction of the unemployment benefits results in higher employment rates, but leads to more inequality. Hiring subsidies (if targeted at the trapped sector) can be a cost effective instrument to bring unemployed back to work. However, they are only suited to reduce the unemployment rate on the margin. Training subsidies can also make a non-negligible long-run contribution. However, they are difficult to implement effectively and it takes a long time until they show their full after-effects.

Of course there are effective policies that lie outside the labor market and that can be analyzed much better in a general equilibrium framework. Let us mention a few:

[10] See Lechthaler, Merkl and Snower (2008).

Government infrastructure investment or investment subsidies for private companies may increase the East German productivity level. A permanent productivity increase which goes beyond the trend productivity growth would increase the labor demand (which is the short side of the market, as Hall and Ludwig, 2007, rightly point out). However, such policies are difficult to implement, as they may strengthen the capital intensity trap if they are implemented by means of capital subsidies.

Another possible option would be to reduce product market distortions. Numerical simulations in our general equilibrium setting[11] indicate however that a reduction of product market distortions could only make a very small contribution to higher employment rates (as they are supposedly smaller than the labor market distortions and as they have to be transmitted from the product to the labor market).

Hall and Ludwig (2007) recommend policies that are more in the Keynesian tradition of aggregate demand, without being very explicit about them. However, a yearly transfer volume of about € 80 billion (about $ 120 billion) shows that policies which stimulate consumption have not been a visible success. Boosting consumption by even higher transfers would make East Germany even more dependent on the "caring hand that cripples." The existing West-East transfers should instead be focused on making the economy more productive (i.e. shifting the labor demand curve upward) or subsidizing labor instead of unemployment (e.g., by issuing hiring vouchers, which would help to build up human capital by "on-the-job training" and learning by doing and which would thus also shift the labor demand).

[11] We set the elasticity of substitution to the typical value of 10 and thus obtain a distortionary mark-up of 11 percent.

6. Conclusion

Hall and Ludwig (2007) point to interesting policy mistakes at the beginning of the nineties, such as problems with the privatization. The analysis of Snower and Merkl (2006) indicates that low productivity, relative to real wages, played an important role in generating the high East German unemployment. A productivity stimulus – regardless of whether it originates within the labor market or outside it (as would have been the case, for example, under a more efficient privatization process) – would have helped reduce East German unemployment. Thus we believe that Hall and Ludwig are not justified in their critique that in our analysis "unemployment is generated solely by labor market imperfections."

We maintain that the labor market developments - "bargaining by proxy" and other labor market institutions - play a crucial role for the persistent unemployment in East Germany, as these policies created unemployment traps and thus long-lasting negative after-effects. Hall and Ludwig (2007) claim that labor market development is "at best secondary factor." Our analysis above shows that this conclusion is unjustified. We believe that the policy advice of Hall and Ludwig is well-meant, but may lead to measures that make East Germany even more dependent of the "caring hand that cripples."

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