

## Conditions of Work and Employment Programme

### ***The German work-sharing scheme: An instrument for the crisis***

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## Preface

Work sharing<sup>†</sup> is a labour market instrument based on the reduction of working time, which is intended to spread a reduced volume of work over the same (or a similar) number of workers in order to avoid layoffs or, alternatively, as a measure intended to create new employment. In times of economic crisis, if properly designed, work sharing not only helps to avoid mass layoffs, it also allows businesses to retain skilled workforces, thus minimizing firing and (re)hiring costs, preserving functioning plants, and bolstering staff morale during difficult times.

Work sharing and partial unemployment benefits are policy responses suggested by the *Global Jobs Pact*, adopted by the ILO's tripartite constituents in June 2009, to limit or avoid job losses and to support enterprises in retaining their workforces.

The German Federal work-sharing programme, called *Kurzarbeit*, is by far the largest work-sharing programme in the world. The programme reached a maximum participation of approximately 64,000 establishments and 1.5 million employees at the height of the crisis in mid-2009.

This working paper takes an in-depth look at Germany's *Kurzarbeit* scheme, and how it has been used as an instrument to combat the economic and jobs crisis. It begins by reviewing the international context, comparing the economic and jobs situation in Germany with the European Union (EU) and the United States and demonstrating that, despite a much stronger decline in German GDP, unemployment in Germany has increased very modestly compared to the United States or the EU as a whole. The paper then reviews what work sharing is; the perspectives of both employers and employees; its use as a labour market policy tool; and how it "works" in Germany. The paper then follows developments in the use of work sharing during the crisis —first expanding in a dramatic fashion with the sharp drop in demand early in the crisis, reaching a peak in mid-2009, and then declining towards the end of that year. It analyses the types of establishments which have used work sharing and for how long; the costs of work sharing; and the extent to which work-sharing participants have participated in further training. The paper concludes with preliminary estimates of the effects of *Kurzarbeit* on employment in Germany during the present crisis, as well as the prospects for the future.

This paper provides an important reference for both governments and the social partners as they consider their next steps in responding to the crisis.

Manuela Tomei,  
Chief,  
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<sup>†</sup> Work sharing is also referred to as "short-time work" and as "partial" or "temporary" unemployment.

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## Acknowledgements

Andreas Crimmann and Dr. Frank Wießner are researchers at the Institute for Employment Research. Professor Lutz Bellmann holds the chair for labour economics at the University Erlangen-Nuremberg and is head of the department “Establishments and Employment” at the Institute for Employment Research.

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## 1. Introduction

Since the bank crash tossed the world into an economic crisis in the second half of 2008, politicians have been eagerly searching for interventions to ease the pain in the labour market. For the German labour market, *Kurzarbeit* (i.e. work sharing or short-time work allowance) may turn out to be the most important instrument of labour market policy. The basic idea is simple and not new at all. Work sharing, in effect, enables enterprises to share the available volume of work between employees. It is not related to “job sharing”, where two persons actually share one job. A number of countries have been operating similar approaches for several decades,<sup>1</sup> but the work sharing in Germany is extraordinary in terms of both establishments and employees participating, in terms of the duration of the programme and in the amount of individual compensation for lost working hours. The German case is therefore of interest for those in the international community, who are considering implementing similar programmes or adjusting existing ones.

By mid-2009, the renewed German short-time work compensation scheme was being used by almost 64,000 establishments and about 1.5 million employees. The intervention was quite expensive: costs borne by the Federal Government amounted to approximately five billion euros for the fiscal year 2009. Apart from changes of administrative procedures and conditions of the programme, some innovative elements were also added: incentives were introduced to combine short-time work with further training, as the extent of further training in Germany is still below international levels (Behringer et al., 2008). Nevertheless, Germany has increased its efforts to meet the requirements due to demographic changes which are more challenging than in many other industrialized countries (Adecco, 2008).

Compared to 2008, the overall German employment record for 2009 was still very good. Given its large decline in GDP, the increase in the unemployment rate was rather low. However, the present success in the labour market may not only be due to work sharing. At the same time, there was a dramatic increase in the use of “working-time accounts”: in the international ranking published by the European Foundation for the Improvement of Living and Working Conditions Company Survey 2009 (European Foundation, 2009), Germany currently holds the fifth position in such working time flexibility.

The paper is structured as follows:

- In Chapter 2, we take a brief glance at the labour market after the global financial meltdown.
- Chapter 3 explains general mechanisms of work sharing and the legal conditions of the German scheme. Here we also discuss work sharing from employers', employees' and public authorities' perspectives, and analyse structures and latest developments. Furthermore, we present an overview of the costs of work sharing for the establishments with respect to the latest labour market reforms in Germany.

<sup>1</sup> For an overview, see, for example, Messenger (2009) or Vroman and Brusentsev (2009).

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- Based on empirical data from the IAB Establishment Panel, Chapter 4 provides some regression analyses on the utilization of short-time work compensation and the utilization of further training on the job while work sharing.
  - In the last chapter, we draw some first conclusions and take a glance on the potential future impact of work sharing in Germany.



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## **2. Economy and employment in the shadow of the crisis**

### **2.1 A panacea?**

For the time being, the provisional appraisal of work sharing is very good in Germany. As we will show in the following section, it managed to save numerous jobs, at least for a while. However, a final and wholesale evaluation will strongly depend on future economic developments. If the present perception of an “unprecedented deep short crisis” is true, recession could be overcome quickly and the economy could recover soon, maybe without too many job losses.<sup>2</sup> But the assessment would be completely different if the economic upturn was weak or the recovery was slow. Under these conditions, work sharing could cause unintended and even negative effects. If work sharing encourages labour hoarding, it might postpone or even hamper the implementation of inevitable changes in an establishment’s organizational environment. Supporting jobs in sectors that are in structural decline could slow down job reallocation. If this is leading to a slowdown of structural changes or even “structural conservatism”, it could even be an obstacle to recovery and growth. Hiring of new workers still occurs, even in a recession, but if the skilled labour force is “locked in” because of work sharing, this labour demand cannot be satisfied.

In the long run, one also has to bear in mind that work sharing is not cheap. Employers, employees and the unemployment insurance have to contribute their share (Crimmann et al., 2009). If the crisis is not “deep and short” but persistent, unemployment cannot be avoided in the end. In this case, the total costs will be significantly higher than the costs of mere unemployment and, at the same time, the chance for alternative interventions would be foregone.

### **2.2 A view on international labour markets**

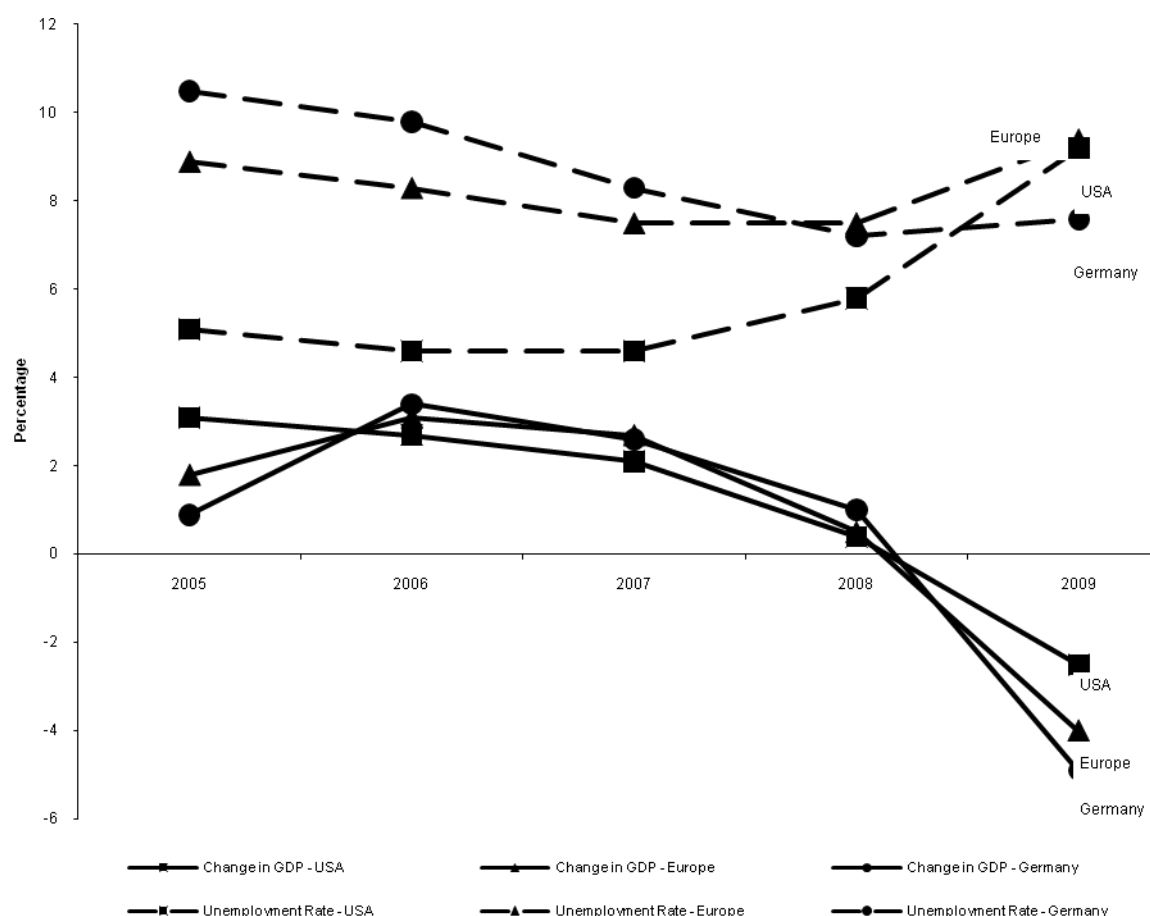
The global economy tumbled into a massive crisis in the second half of 2008. The entire consequences cannot be fully overseen yet and – despite some gleams of hope – a happy end is still out of sight. The reactions of different countries to the crisis have been very different. While some are foremost making efforts to stabilise their economy and avoid downturns, others try rather to stabilise their labour markets and avoid layoffs. Consequently, work-sharing schemes are found in several other countries as well. Wandner (2008) reports programmes for five more European countries besides Germany: Austria, Belgium, Finland, Luxembourg and Spain. According to Messenger (2009), work sharing also exists today in France, the Netherlands and Switzerland. Among non-European countries, the Republic of Korea, Japan and a number of states in the United States also have similar schemes. Messenger (2009, p. 3) also notes “...that in the context of the global economic and job crises, a few developing and transition countries have begun to discuss and experiment with some basic forms of work sharing, including Chile, Costa Rica and Uruguay in Latin America, and the Czech Republic, Hungary, Slovakia and Slovenia in Eastern Europe”. Unsurprisingly, the programmes in these countries vary widely in terms of eligibility, benefits, duration, outreach and budget. While Germany has the largest scheme in the world, only 17 states in the United States have programmes, of which only half a dozen are of substantial size (Messenger, 2009, p. 3; Balducchi and

<sup>2</sup> The future developments are still uncertain: at present, experts discuss the possibility of W-, U-, or L-shaped courses of the crisis. Optimists presume a V-shaped course, i.e. a deep, but short, cut.

Wandner, 2008). Hence it might be instructive to take a closer look at countries or regions with different approaches.

As noted, the German labour market is still in remarkably good condition. In fact, according to the OECD, the unemployment rate for Germany only increased from an average of 7.2 per cent for 2008 to 7.6 per cent for 2009. In the same period, the average unemployment rate of the European Union rose by 1.9 percentage points; in the United States, an increase of 3.4 percentage points from 5.8 per cent to 9.2 per cent was observed. Graph 1 provides an overview of the latest developments.

**Graph 1: Indicators of business cycle: Changes in GDP in market prices and unemployment rates (2005-2009)**



Note: Figures based on quarterly statistics; gross domestic product based on deflated market prices; unemployment rate as percentage of labour force.

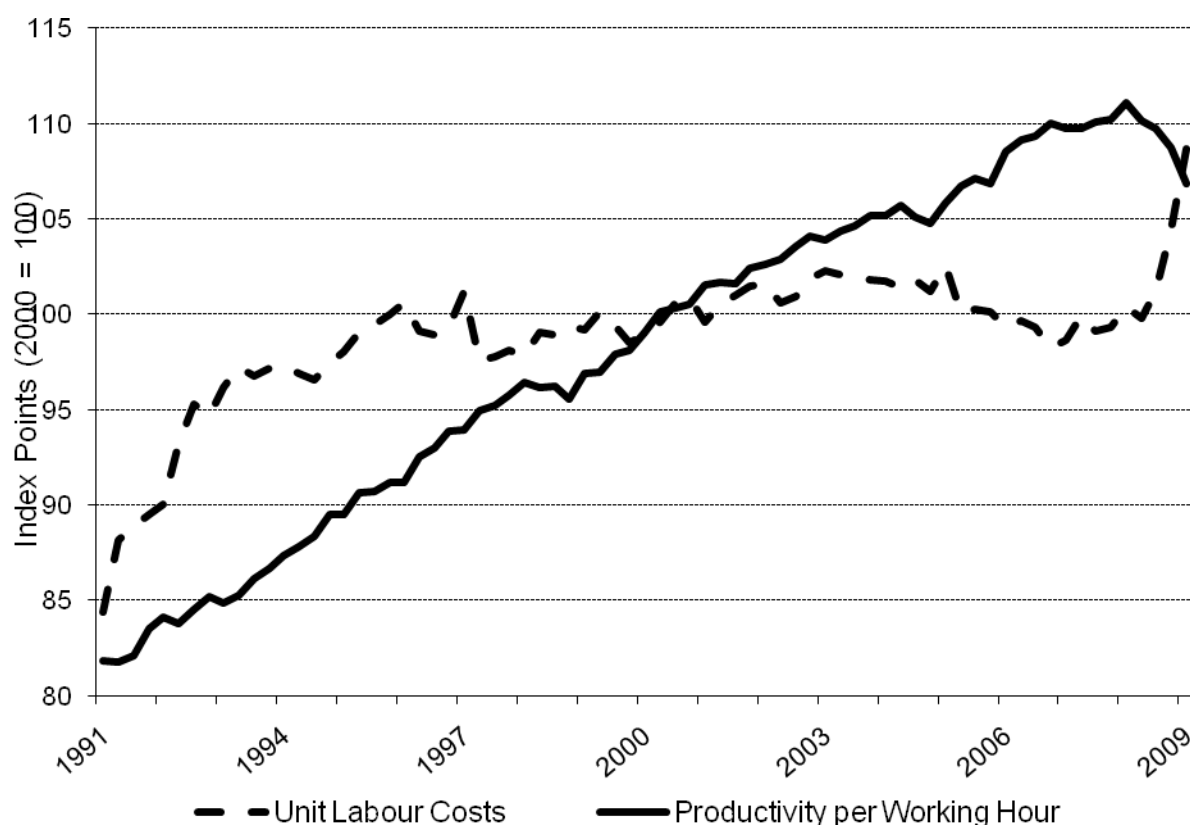
Source: OECD (2009).

Graph 1 also shows a clear interrelation between the unemployment rates and the development of the GDP. For the United States, the rise of unemployment is obviously inversely related to the development of the GDP. Compared to the European Union and the United States, the German economy is suffering a much stronger decline. Therefore, in this shrinking economy, a total of 3.2 million jobs would actually have been redundant, as Möller and Walwei (2009) argue. Even more astonishingly, the unemployment rate increased just moderately.

Between 1991 and the beginning of the crisis in 2008, we observe a linear increase in labour productivity (Graph 2). Since the 1990s, labour costs per unit have remained stable

in Germany, whereas they have risen in many other countries along with productivity. In fact, unit labour costs have lagged productivity growth in Germany for most of the last decade. This explains how Germany has been able to rely on exports, rather than domestic demand, for a long time. But since the beginning of the economic crisis, productivity significantly declined in Germany while unit labour costs have risen.

**Graph 2: Development of unit labour costs and productivity per working hour in Germany (1991-2009)**



Source: Bach et al. (2009a).

At the same time, Graph 1 shows that the German economy is suffering a much stronger decline of GDP than most of the other OECD countries. In the United States, for instance, the unemployment rate rose inversely to the development of the economy.

Before discussing potential remedies, one has to understand the core of the crisis. After some international real estate markets collapsed, the international finance markets tumbled into massive turbulences. Germany itself does not have a real estate crisis, but is suffering heavily in the finance sector. While Germany does not have structural problems in terms of a national debt, German banks did buy the debt, causing more than one bank to fail and creating an extraordinary amount of concern for the rest of the German banking system.

Germany is one of the leading export nations in the world, with a huge export surplus. As a consequence of the German export-reliance and weakness of domestic demand, one would expect direct and serious labour market effects. The global crisis initially hit export-oriented industries in Germany, i.e. the manufacturing industry. Other sectors are affected only indirectly by the decline of orders from the exporting establishments. Consequently, the global players among German companies are suffering more than small or medium-sized suppliers of local and regional markets. Nevertheless, the labour market is still stable and resistant to the economic downturn. Unlike many other industrialized economies,

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Germany does not have structural problems in the sense of a bursting real estate bubble emitting shock waves to other sectors (Fritzsche, 2009).

One explanation may be that the shock waves of the crisis have not yet reached the labour market fully, since this partial market follows the general economic developments with a time-lag. After the outbreak of the crisis, establishments first managed to survive for a certain time on a comfortable order backlog. Another reason for the “German Wunder” is that German establishments obviously do not practice labour market flexibility by numbers, but by hours. The next step was a reduction of overtime and working time accounts<sup>3</sup> and a hiring freeze. After that, temporary workers and freelancers were laid off and fixed-term contracts expired without prolongation (Crimmann and Wießner, 2009). Establishments did not lay-off their core employees, but instead reduced working hours temporarily. This was affordable due to the previous productivity gains in connection with moderate collective bargaining. In addition, de-regulations of the labour market increased its flexibility. Flex-time, working hours accounts and company-level pacts for employment enabled establishments to adjust their production quickly to market changes without reducing the staff. Finally, after utilizing these flexibility buffers, establishments started an extensive use of *Kurzarbeit* (work sharing), which provides an attractive financial support for both employers and employees. All in all, the combination of these reforms and instruments increases both the external flexibility of the labour market as a whole and, as well, the internal flexibility of the establishments. As a consequence, labour hoarding becomes an attractive alternative to “hire and fire”.

<sup>3</sup> In Germany, working time flexibility in collective agreements often takes the form of working time accounts, allowing companies to deviate temporarily from the agreed weekly working time by compensating the worker with free time within a specified period. With the help of annual working time accounts, overtime above a certain threshold would be accumulated and later compensated by free time.

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## 3. Work sharing

### 3.1 General mechanisms of work sharing

In the economic crisis, work sharing can be an important macro-economic stabilizer. Beneath the positive psychological effect for the individual of not being unemployed, it has as well an important impact on public sentiment and the perception of the level of unemployment. Consequently, the immediate benefits in terms of supporting domestic demand could be stronger than the same expenditure on unemployment benefits. Even with the same disposable income, a worker who is on a work-sharing scheme rather than in unemployment could have a higher propensity to consume. This could help to explain why private consumption has held up remarkably well during the crisis. However, since we have only micro-economic data on the establishment level available, we cannot present any empirical macro-economic analyses in this paper. In line with neo-classical theory, we take the simplifying assumption that employees, employers and policy-makers act in a narrowly utility-maximizing way in terms of income forgone, labour cost or cost of financing benefits.

#### 3.1.1 Employers' perspective

The economic crisis acts as an exogenous transitory shock for the labour market which primarily reduces the demand for goods and products. As a consequence, the marginal productivity of labour (MPL) falls below the wage rate  $w$ . This leads to a declining demand for labour  $L$ . In the short term, labour can hardly be substituted by capital. Therefore production can only be adjusted to the lower demand for goods by varying  $L$ . This can only be realized by reducing staff or reducing working hours.

This raises a fundamental question for the establishment: Which employees should be kept and which ones should be laid off? A glance at human capital theory can give the answer. Basically, an establishment is more likely to keep an employee if it has invested in his human capital before. In a simple model, we differentiate between two groups of employees with different tendencies to leave the company due to their different types of human capital:<sup>4</sup>

- Group A: employees with general, unspecified human capital. These receive a wage of  $w_A$  according to their marginal productivity.
- Group B: employees with specific, establishment-related human capital. These receive a wage of  $w_B$  below their marginal productivity.

The rational choice of a company with declining marginal productivity (MPL) and fixed wages would be the following:

- In the *short term*, the company would lay off A and keep B because  $w_A > \text{MPL}_A$  and  $w_B < \text{MPL}_B$ .
- In the *mid term*, the company would still keep B despite  $w_B > \text{MPL}_B$ , because recruiting and training costs are still higher than costs of firing if the company returns to the previous production level after the recession.

<sup>4</sup> See *in extenso* Becker (1964).

- 
- In the *long term*, the company would lay off all employees with  $w > MPL$ .<sup>5</sup>

This explains why work sharing does not apply equally for all employees in an establishment. There are two strategic options from the employer's point of view:

1. "turnover";
2. "steadiness".

The first option basically consists of hiring, firing and re-hiring. In that case, the company first will suffer a brain drain. Furthermore, there will be direct monetary costs due to the lay-offs (e.g. for compensations) and for new recruitments and training on the job. Labour hoarding as the second option implies costs for work sharing (e.g. employer's contribution to short-time work compensation) and remanent costs (e.g. for the maintenance of machinery which is temporarily not used due to loss of work).

With a given loss of work, the German legislative framework provides three basic options for the employers:

1. maintain regular employment;
2. work sharing (with or without qualification or training measures);
3. lay-offs.

Naturally, option 1 can only be put into practice for a very limited time. A rational employer who anticipates a longer loss of work will base his decision on an estimation of the opportunity costs of options 2 and 3, i.e. "steadiness" and "turnover". He will prefer work sharing to lay-offs if the expected costs of work sharing and the remanent costs are lower than the expected costs of hiring and firing (Bach et al., 2009b). Work sharing reduces the cost of labour for the establishments since they have to pay only for the work performed. Losses of company-specific know-how or brain drain towards competing companies are avoided, as well as internal turbulence due to mass lay-offs. The criteria in Germany for the selection of staff to be laid-off are called "social criteria" and consist of firstly seniority (in terms of years with the company), then marital status (i.e. dependents) and then individual age. On the other hand, special skills and know-how can strengthen a person's position in the selection process. Labour hoarding saves time and money for new recruitment and training on the job if establishments increase the number of staff again when the economy recovers from recession. Beyond mere rationality, one should also bear in mind that trustful and thoughtful cooperation between employers and employees has a long tradition in Germany. In the light of these industrial relations, employers might feel some solidarity or social responsibility for their workers.

### **3.1.2 Employees' perspective**

Work sharing can be a double-edged sword for the individual: it can prevent unemployment or at least offer a short delay. Work sharing clearly indicates that the job is in danger. On the other hand, it is also a signal that the company prefers to keep an employee rather than firing him. Income losses are the price the employee has to pay for staying employed. However, it is unclear if this is sufficient to save the job and if the future with the company is really worth it.

<sup>5</sup> See Backes-Gellner et al. (2001).

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Hence the employee has two options:

1. stay (with work sharing);
2. leave.

Like the employer, a rational employee will assess the opportunity costs of his options. He will prefer work sharing if the anticipated loss of income is lower than the expected costs of changing jobs. The latter includes e.g. potential unemployment, costs for new job search, uncertainty about future income and, as well, potential loss of social status or social contacts (Crimmann and Wießner, 2009). Taking also the psychological stress of being unemployed into account, one can conclude that work sharing might well be preferable.

### **3.1.3 Active and passive labour market policy perspective**

Among the instruments of labour market policy, work sharing is somehow exceptional as it has two faces: as an instrument of *active* labour market policy, it is granted to the employer to help the establishment to overcome a temporary loss of work and avoid lay-offs; for individuals, it rather appears as an instrument of *passive* labour market policy which helps them to make a living despite temporary wage losses.

Like employers and employees, the unemployment insurance also has two options:

1. stabilize employment by compensating loss of work;
2. compensate hardships due to unemployment.

From the perspective of the unemployment insurance, investments in work-sharing schemes to maintain employment are only rational if the loss of work is temporary and not due to structural deficits of the affected industries. The alternative to work sharing would be unemployment. The unemployment insurance then would have to grant unemployment benefits and provide labour market services like job placement or vocational counselling.

On the one hand, work sharing helps to avoid deskilling of workers and hence losses of human capital while being unemployed; on the other hand, one can argue that the re-allocation of workers between firms might be postponed by granting incentives for labour hoarding (Crimmann and Wießner, 2009). We have to take into account, however, that workers' skills deteriorate when they are exposed to long spells of unemployment; therefore firing and re-hiring can be inefficient as well.

Again, this is a decision under uncertainty. One reason why Germany decided to go for massive work sharing was the intention to avoid an increasing persistence of unemployment. Traditionally, both the employment agency and policy-makers have a strong political incentive to avoid unemployment at almost any cost. This holds especially true in an election year like 2009, and might also indicate that the policy changes presented in Table 1 in section 3.3 had – at least in part – a political motivation. In a recession, the average duration of unemployment especially tends to be longer. This would devalue the latest labour market reforms and cause higher costs of unemployment. However, deadweight effects of work sharing cannot be generally denied. One option to reduce these is the limited duration of work sharing. In Germany, the fear of negative effects was obviously outweighed by the fear of mass unemployment in the course of the crisis. Given some uncertainty about its economic impact, the implicit social function might have tipped the scale for work sharing in Germany. Unemployment has a disutility for workers that goes beyond the loss of income and sometimes even leads to psychological trauma.

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Maintaining employment can thus be welfare maximizing in a broader understanding, even if it entails slight micro-economic inefficiencies.

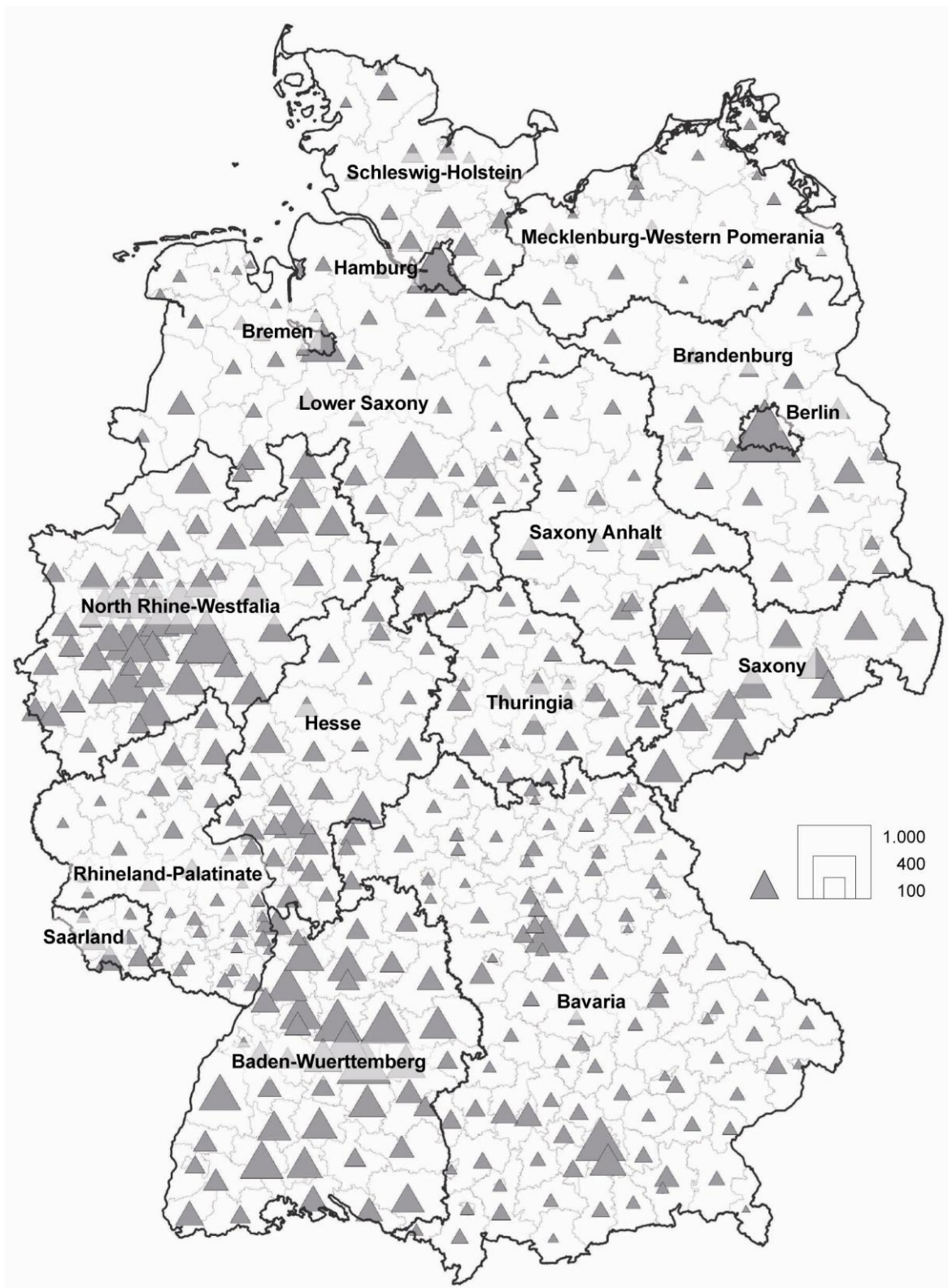
### 3.2 Cores and causes

Before discussing potential remedies, one has to understand the core of the crisis. For Germany, the crisis is exogenous and has obviously no structural reasons. After some international real estate markets collapsed, the international finance markets tumbled into massive turbulences. Germany itself does not have a real estate crisis, but the exporting industries which are very important for the German economy are hit hard. Consequently, the global players among German companies are suffering more than small or medium-sized suppliers of local and regional markets.

As Graph 3 shows, the majority of the establishments with work sharing is located in the western and southern parts of Germany with large shares of manufacturing and especially automotive industries. The same is true for the number of participants in work sharing and the ratio of participants in relation to persons in paid employment (Graph 4). At least these are rather prosperous regions in Germany, with a solid industrial structure and sound financial background. For the time being, they *still* have a financial back-up to make it through the crisis. All in all, the economic performance of the previously successful regions is declining whereas those with notorious structural problems rather managed to maintain the *status quo*.

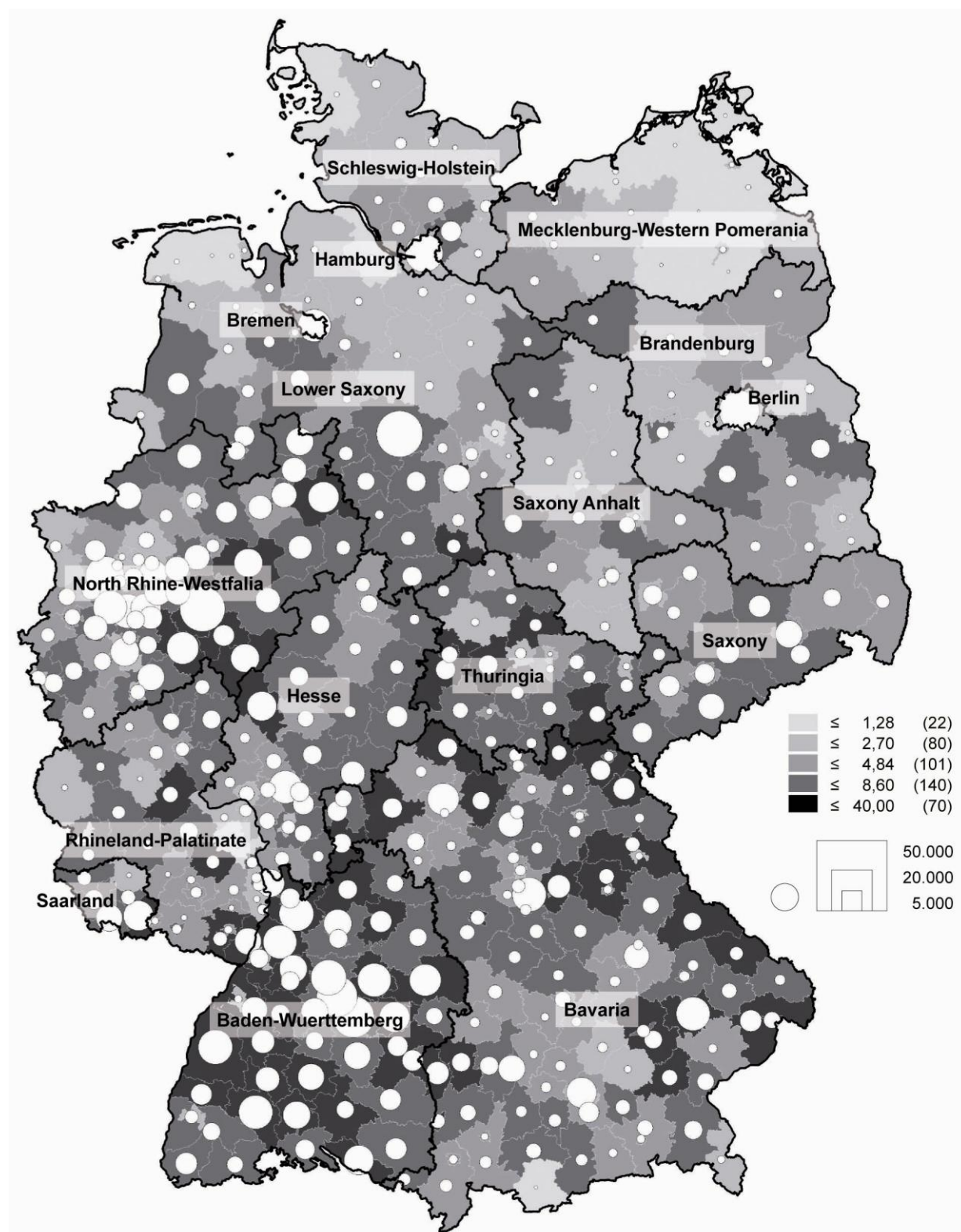


Graph 3: Total number of establishments with work sharing (June 2009)



Source: Schwengler and Loibl (2010).

Graph 4: Work sharing ratio (in percentage of persons in waged employment) and total number of participants in work sharing (June 2009)



Source: Schwengler and Loibl (2010).

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### 3.3 Legal conditions of work sharing in Germany

There are three types of work sharing in Germany.

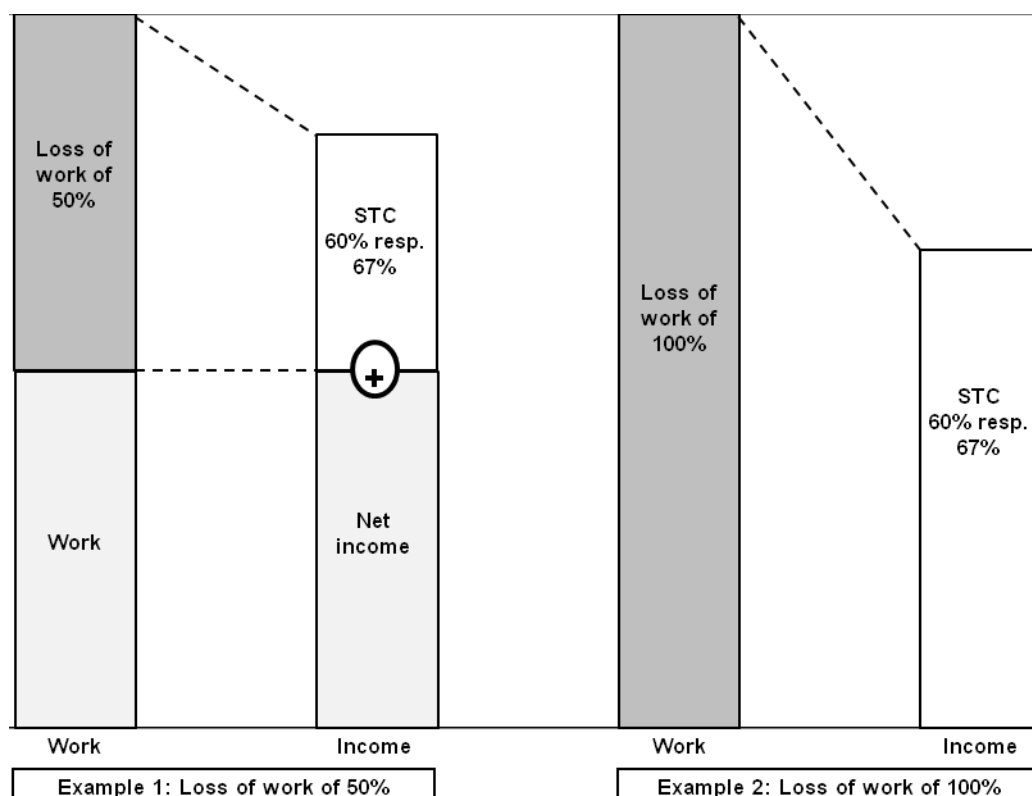
1. “*Transfer-Kurzarbeit*” for permanent loss of employment<sup>6</sup> due to re-structuring measures on the establishment level (Social Code III, § 216b). This instrument had been used extensively in East Germany after the reunification, when large parts of East German industry broke down in the course of the transformation. It was mainly dedicated to avoid mass lay-offs. The amount of short-time work compensation is similar to unemployment benefits.
2. Seasonal short-time work (Social Code III, § 175) is mainly used in the construction sector and other “outdoor professions” like landscape gardeners to compensate for non-productive times due to weather conditions in the winter season. Otherwise workers in these professions would be laid-off at the beginning of the winter and re-hired in springtime. Seasonal short-time work compensation can be granted from 1 December to 31 March.
3. Short-time work for economic reasons if there is a temporary, unavoidable loss of employment due to economic factors or to an unavoidable event – the most important type of *Kurzarbeit* (Social Code III, § 170). It provides a breather for the establishments during the economic crisis and hence contributes to the protection of jobs and the maintenance of employment (this is the core instrument this article deals with).

In Germany, either the management or the works council can request work sharing for economic reasons for the establishment. Beforehand, the company has to prove that other flexibility measures – like reduction of overtime or working hour accounts or holidays – have been utilized as far as possible. After that, short-time working compensation is an alternative to lay-offs. The company then has to submit some kind of work-sharing plan to the local employment agency,<sup>7</sup> which indicates the estimated amount of work reduction in terms of jobholders and duration. Short-time working compensation (STC) is available for all jobholders covered by the social security system with a loss of at least 10 per cent of gross monthly earnings. The calculation of the individual STC is just like the calculation of unemployment benefits: for the lost working hours, employees with at least one dependent child receive a compensation of 67 per cent of the net difference to the regular wage, whereas those without dependents get 60 per cent; for a loss of work of 100 per cent, the STC has the same amount as the unemployment benefits (see, for example, Crimmann and Wießner, 2009). Graph 5 shows the calculation of the short-time working compensation.

<sup>6</sup> Note: the legal status of the participants of “*Transfer-Kurzarbeit*” is still “employed”.

<sup>7</sup> The German Federal Employment Agency has 180 local employment agencies nationwide, with a total of approximately 640 local offices.

**Graph 5: Calculation of short-time working compensation (STC) for partial and total loss of work**



Note: STC is 60 per cent of the net wage loss due to work sharing, and 67 per cent with at least one dependent child living in the household.

Unlike unemployment benefits, the compensation for work sharing is granted to the establishment and not to the individual. First the company has to calculate it and add it to the individual paychecks according to the reduced working hours. By the end of the month, the employer has to report exact monthly figures to the employment agency for an exact and final accounting. On this basis, the employer gets the STC as a reimbursement.

The German government made some changes last year: from 1 January 2009, the maximum duration of STC was extended to 18 months. On 5 June 2009, the maximum duration was extended even to 24 months by verdict of the labour department. Since 1 January 2010, the duration has been limited to 18 months again. Furthermore, the government simplified the application procedure in 2009 and reduced employers' contributions to the social insurance of short-time workers. Table 1 shows the most important requirements and conditions of work sharing in Germany.

**Table 1: Requirements for “Kurzarbeitergeld” (short-time working compensation) in Germany (according to §§ 169ff of the Social Code III)**

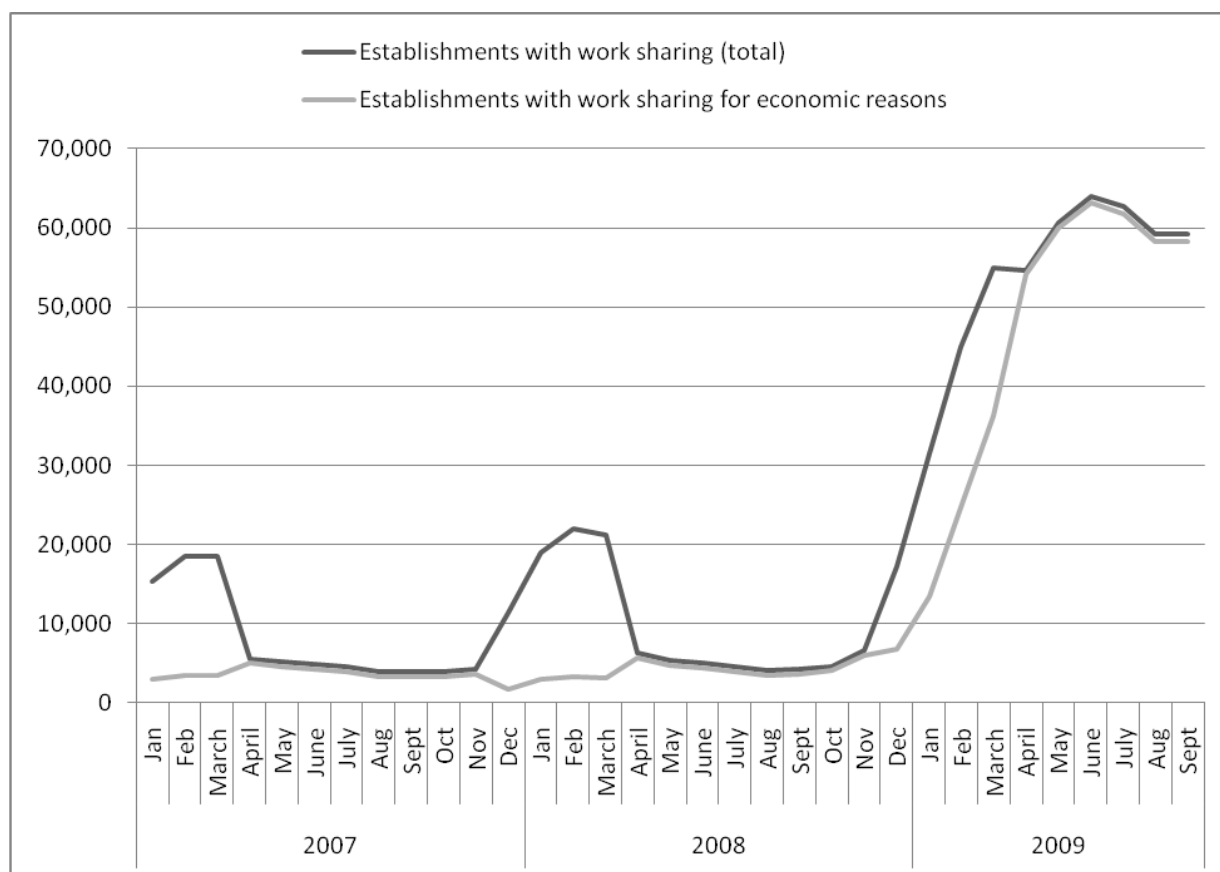
Requirements	Comments
Significant unavoidable loss of work	The loss of work must be due to economic reasons (not structural ones) and unavoidable. It must be temporary (not permanent, i.e. there should be a sound chance to return to a normal workload in the future). At least one-third of the whole staff (without apprentices or trainees) must be affected with an estimated loss of income of at least 10 per cent. On the individual level, working hours can be reduced up to 100 per cent.
Latest reform	Since 1 February 2009 until the end of 2010, a loss of work counts as significant if less than one-third of the entire staff is affected by a loss of 10 per cent. The compensation can even be granted if the establishment is not able to provide full employment to at least one jobholder.
Requirements to the establishment	There must be at least one regularly employed jobholder (Social Code III, § 171). There should be a sound chance that the establishment will return to regular working hours with a reasonable workload in the future.
Individual requirements	The employment contract must be maintained, i.e. the employee must not be laid-off nor must there be any agreements to dissolve the contract. The individual is also eligible for STC in case of disability to perform labour due to illness. The individual is obliged to accept other job offers from the employment agency while receiving the compensation.
Notification	Either the employer or the works council are obliged to notify the estimated loss of work to the local employment agency and prove the conditions of eligibility for receiving STC.
Contributions to social insurance	For the amount of working hours being lost due to work sharing, the contributions to social insurance are reduced to 80 per cent. The employer has to cover the full amount.**
Latest reform	Since 1 February 2009, the Federal Employment Agency covers 50 per cent of the contributions to social insurance for the loss of work. In case of training on the job during the loss of work, the Federal Employment Agency covers 100 per cent of the contributions. Under certain conditions the costs of the training measures can be reimbursed up to 100 per cent.
Latest reform	Since 1 July 2009, the Federal Employment Agency covers the contributions to social insurance for the loss of work completely from the seventh month of work sharing – even without any training measures and regardless of the amount of working hours being lost.
Disqualification	Recipients of unemployment benefits or similar benefits while participating in publicly financed training measures do not qualify for STC.
Duration	The duration of work sharing is institutionalized for all employees of an establishment. It starts with the first month of the payment of STC. If there is an interruption of work sharing for at least one month, the duration extends equivalently. After a break of at least three months, a new period of work sharing may be started.
Last reform	Since 1 July 2009, employers or works councils do not necessarily have to re-apply for STC if the interruption is less than two months.

\*\* Normally, contributions to social insurance (retirement fund, unemployment insurance, health care, medicare) are paid equally by employer and employee. The contributions to social insurance total up to approximately 40 per cent of the gross wage (i.e. both employer and employee have to pay a share of 20 per cent). The contributions to the obligatory accident insurance are paid entirely by the employer.

### 3.4 Work sharing on the rise

The role of work sharing as an instrument of active labour market policy was rather marginal before the economic crisis. Only seasonal short-time work was used as a temporary benefit for jobholders mainly in the construction sector and other outdoor occupations. Since August 2008, however, we observe a tremendous increase in the use of short-time work for economic reasons. From that time on the number of establishments with work sharing for economic reasons rose continuously (Graph 6). For now, most of the establishments apply for work sharing for a period of six to eight months.

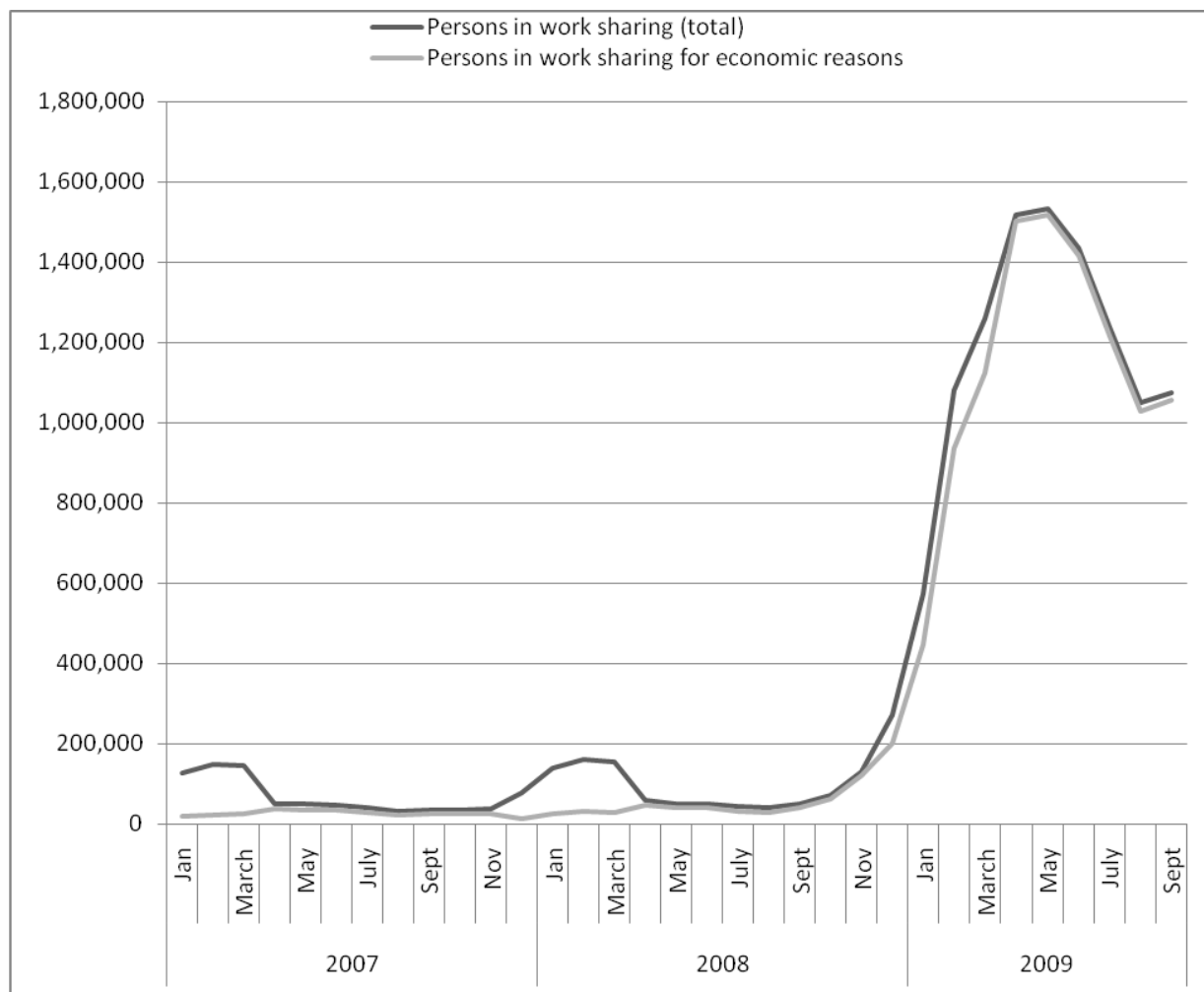
**Graph 6: Establishments with work sharing (January 2007-September 2009)**



Source: Own calculations, based on data from the Federal Employment Agency (2010).

The latest developments illustrate the importance of work sharing for jobholders during the last year. As the official statistical data on work sharing are only available with a time-lag of three months, the time series currently ends in September 2009. For the time being, work sharing reached its peak in May 2009 with more than 1.5 million participants. At that time, about 60,000 establishments were using work sharing. In September 2009, the average loss of work was about 30 per cent, equivalent to 320,000 jobs. In the summer of 2009, we observed a decline of participants which led to a temporary stabilization; by the end of the year, the number of new entries rose again both in terms of establishments and individuals.

**Graph 7: Participants in work sharing (January 2007-September 2009)**

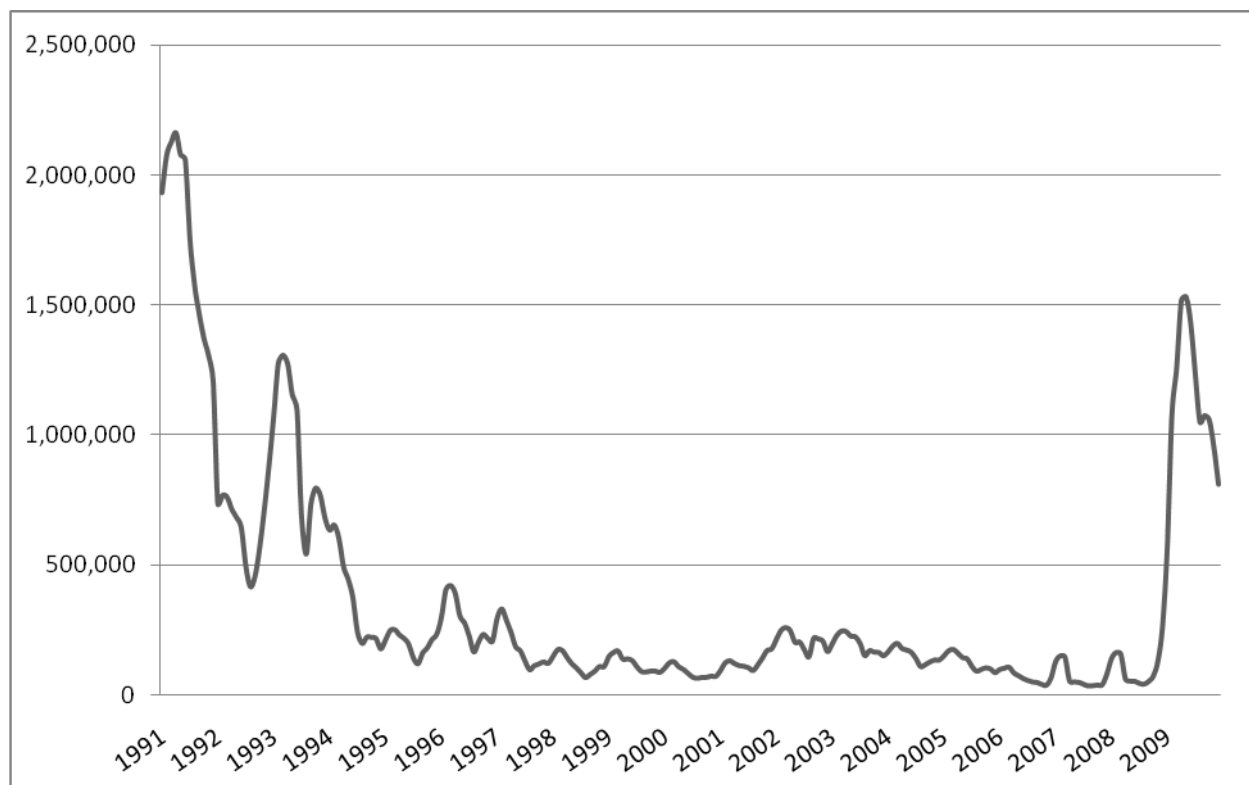


Source: Own calculations, based on data from the Federal Employment Agency (2010).

In fact, the extensive use of work sharing is not new for Germany (see Graph 8). It had already happened before in the early 1990s. At that time, it was mainly utilized to cushion the loss of work in East Germany in the course of the German reunification: “*Transfer-Kurzarbeit*”, i.e. work sharing due to re-structuring measures on the establishment level contributed the largest part of the total number of participants. However, the programme was just able to postpone the job losses for a while but not to avoid them. The strong increase in unemployment in East Germany in the first half of the 1990s is a clear indication that work sharing can compensate economic hardships for a while but cannot overcome structural deficits of the industry. A second wave of work sharing could be observed in 1993 in the West German car manufacturing industry, which was in a difficult situation at that time (Eichhorst and Marx, 2009). Again, job losses could not be avoided permanently.



**Graph 8: Total number of participants in work sharing (January 1991-September 2009)**



Note: Total number includes participants of all three types of work sharing.

Source: Own calculations, based on data from the Federal Employment Agency (1991-2009).

### **3.5 Structure of establishments with work sharing**

#### **3.5.1 Sectors of industry**

From the German perspective, the economic crisis is a temporary exogenous shock which mostly strikes export-oriented sectors (i.e. the manufacturing industry), whereas the service sector was just affected indirectly. The “*Abwrackprämie*”, an allowance which was granted to car buyers who purchased a new car and traded in the old one,<sup>8</sup> avoided hardships for the German automobile and automotive industry, a core industry in Germany. Graph 9 shows the five hardest-hit economic sectors. As can be seen, 220,000 jobholders in the engineering sector were in work sharing due to economic reasons in September 2009. This is equivalent to a share of 22.7 per cent of all jobholders in this sector.

<sup>8</sup> The American equivalent scheme was “cash for clunkers”.



**Graph 9: Top five sectors with work sharing (September 2009)**



Source: Own calculations, based on data from the Federal Employment Agency (1991-2009).

### **3.5.2 Duration and volume of work sharing**

In September 2009, the actual duration of work sharing was up to six months in two-thirds of the establishments. This is probably due to the fact that most of the establishments announce a duration of six months when notifying the expected loss of work to the employment agency. But as Table 2 shows, work sharing for another third of the establishments has already reached a duration of six to 12 months. The fact that we observe hardly any establishments with work sharing over a period of one year or even longer might have two reasons: firstly, the crisis reached the labour market in autumn 2008, i.e. just one year previously; and secondly, this can be an indication that most of the establishments are neither willing nor able to extend work sharing over one year (Crimmann et al., 2009). As will be shown later on, the labour costs while work sharing are relatively higher for the establishments than regular work because of the additional costs.

The situation is rather similar concerning the participants of work sharing: about half of them were receiving STC for up to six months and the other half of them for up to one year. Again, participating in work sharing for more than one year was the exception. As the crisis is not yet over, one can expect an increase in the average duration of work sharing.

**Table 2: Loss of work and duration of work sharing (September 2009)**

Duration of work sharing	Establishments		Participants		Loss of work
	Number	Share (%)	Number	Share (%)	Average (%)
Up to 3 months	14,670	25	157,806	15	32
More than 3 to 6 months	22,342	38	329,528	31	31
More than 6 to 12 months	20,653	35	562,994	52	31
More than 12 to 18 months	1,065	2	17,750	2	35
18 months and more	491	1	6,369	1	43
<b>Total</b>	<b>59,221</b>	<b>100</b>	<b>1,074,447</b>	<b>100</b>	<b>31</b>

Source: Own calculations, based on data from the Federal Employment Agency (2009).

### 3.6 Costs of work sharing for the establishments

Work sharing is an option for establishments to reduce operating costs. Basically, wages have to be paid only for work performed but not for the loss of work. However, the loss of work itself is as well costly for the establishments: firstly, because of the additional costs (see section 3.1.1) and secondly, because of the contributions to social insurance. In fact, until the beginning of 2009 these costs were considerable. Since then the programme underwent some changes (see Table 1: Latest reforms). In any case, the employer still has to pay for the work performed and for the employer's share of contributions to social insurance.

Contributions to health insurance, medicare and retirement are still payable for the loss of work. As STC is provided by the Federal Employment Agency, the employer does not have to pay contributions to the unemployment insurance for the loss of work. Contributions to the accident insurance, which are fully under the responsibility of the employer, are not affected by any loss of work since they depend on the number of employees and the type of work. The social insurance contributions for the loss of work are based on 80 per cent of the gross wage difference, i.e. the difference between the regular individual gross wage and the individual gross wage while work sharing. Whereas the contributions to social insurance are normally shared equally between employer and employee, in the case of work sharing the employer has to cover the full amount for the loss of work. Since February 2009, the Federal Employment Agency covers 50 per cent of these contributions to social insurance.<sup>9</sup> Nevertheless, with work sharing the loss of work still has its price and therefore some impact on current costs of labour. Basically, costs of labour consist of three parts:

1. Current costs change with the amount of work being performed. This is true for gross wages and contributions to social insurance.<sup>10</sup>
2. Quasi-fixed costs do not depend on working hours but on the number of employees, e.g. costs for hiring and firing or training on the job.

<sup>9</sup> If the establishment provides on-the-job training while work sharing, the Federal Employment Agency covers the entire costs of social contributions for the loss of work (see Table 1). From the seventh month of work sharing, the Federal Employment Agency covers the social contributions for the loss of work as well.

<sup>10</sup> In Germany, the social insurance has a contribution ceiling in 2010 of an annual income of 45,000 euros for health care, and 58,800 euros (East Germany) and 66,000 euros (West Germany) for unemployment insurance and retirement fund (German Ministry for Labour and Social Affairs).

3. Fixed costs, like rents or leasing rates for the pool of company cars, cannot clearly be assigned to individuals.

We are now going to analyse the *current costs of work sharing for an establishment* for the wide-spread case that wages correspond with working hours. The model does not take into account any additional costs (fixed and quasi-fixed costs). We make the simplifying assumption that current costs of work only consist of gross wages and contributions to social insurance. We find:

$$\underbrace{W}_{\substack{\text{current costs of work} \\ \text{(without quasi-fixed} \\ \text{costs of employment)}}} = \underbrace{w}_{\substack{\text{wage rate} \\ \text{(including employer's share of} \\ \text{contributions to social insurance)}}} \cdot \underbrace{L}_{\substack{\text{factual volume of work}}} \quad (1)$$

As we learn from Equation 1, the costs of work  $W$  are a function of the pay rate  $w$  (including the employer's contributions to social insurance) and the volume of work  $L$  in terms of working hours performed.

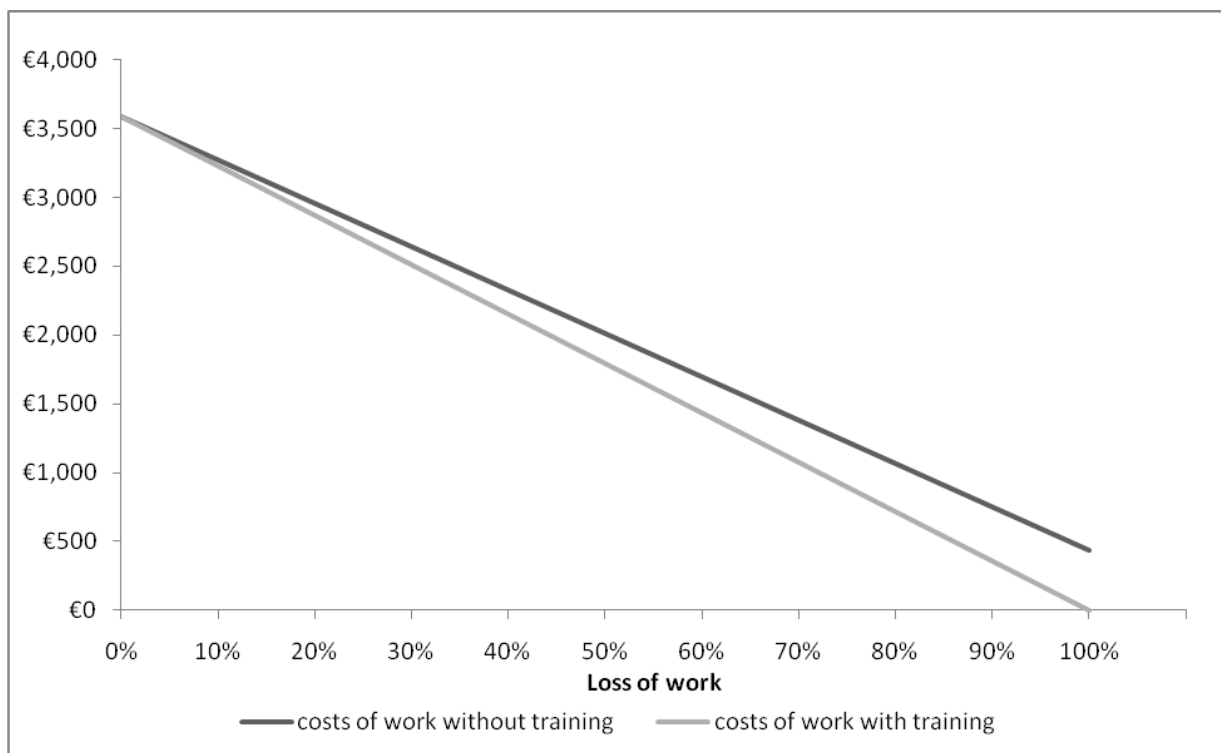
In the case of work sharing, the employer has to pay for the work being performed ( $W_b$ ) plus contributions to the social insurance ( $S$ ). In the case of work sharing these consist of the employer's share for the work being performed and for *both* employer's and employee's share for the loss of work (Equation 2).

$$\underbrace{W}_{\substack{\text{current costs of work} \\ \text{(without quasi-fixed} \\ \text{costs of employment)}}} = \underbrace{W_b}_{\substack{\text{gross wage}}} + \underbrace{S}_{\substack{\text{employer's contributions to social insurance} \\ \text{(Employer's contributions for work performed} \\ \text{+ employer's contributions for loss of work)}}} \quad \text{with } S = S_{\text{work}} + S_{\text{loss}} \quad (2)$$

As a consequence from Equation 2, the costs of work are declining linearly as Graph 10 shows. In our example, we assume monthly gross costs of work of 3,590 euros (3,000 euros gross wage plus 590 euros for employer's share of social contributions).<sup>11</sup> Given a loss of work of 60 per cent compensated by STC, the costs of work are reduced to a total of 1,698 euros [1,200 euros gross wage plus 236 euros social contributions for the employer plus 262 euros social contributions for the loss of work (black line)]. Under the same preconditions, but with training on the job while work sharing, the costs of work are reduced to 1,436 euros per month [1,200 euros gross wage plus 236 euros social contributions for the employer (grey line)]. Since 1 July 2009, these regulations apply for work sharing from the seventh month on.

<sup>11</sup> Note: Figures are valid for April 2009.

**Graph 10: Costs of work while work sharing in relation to loss of work**



Note: Costs of work under legal conditions for the first six months of work sharing, with and without additional training measures, in relation to loss of work.

Source: Own calculations, based on fictitious figures.

In case of 100 per cent work sharing, i.e. a total loss of work, the employer would still have to pay the entire contributions for social insurance. If the establishment offers some job training<sup>12</sup> for the recipients of STC for that time, the Federal Employment Agency covers the social contributions for the loss of work and these costs can be reduced to zero.

Taking the contracted working time as 1, in case of work sharing an employee performs an amount of working hours  $L$  with a loss of work of  $(1 - L)$ . The current costs of work total up as follows:

$$W = \underbrace{w_b \cdot L \cdot (1 + s_{\text{work}})}_{\text{regular work}} + \underbrace{w_b \cdot (1 - L) \cdot s_{\text{loss}}}_{\text{short-time work}} \quad (3)$$

But from an entrepreneurial point of view, not only the total costs of work while work sharing are of interest; for managerial decisions about the amount of work sharing, the costs of labour per working hour play an important role as well. These can be calculated as follows: from  $W = w \cdot L$  follows  $w = W / L$ , which stands for the factual costs of a working hour performed while work sharing:

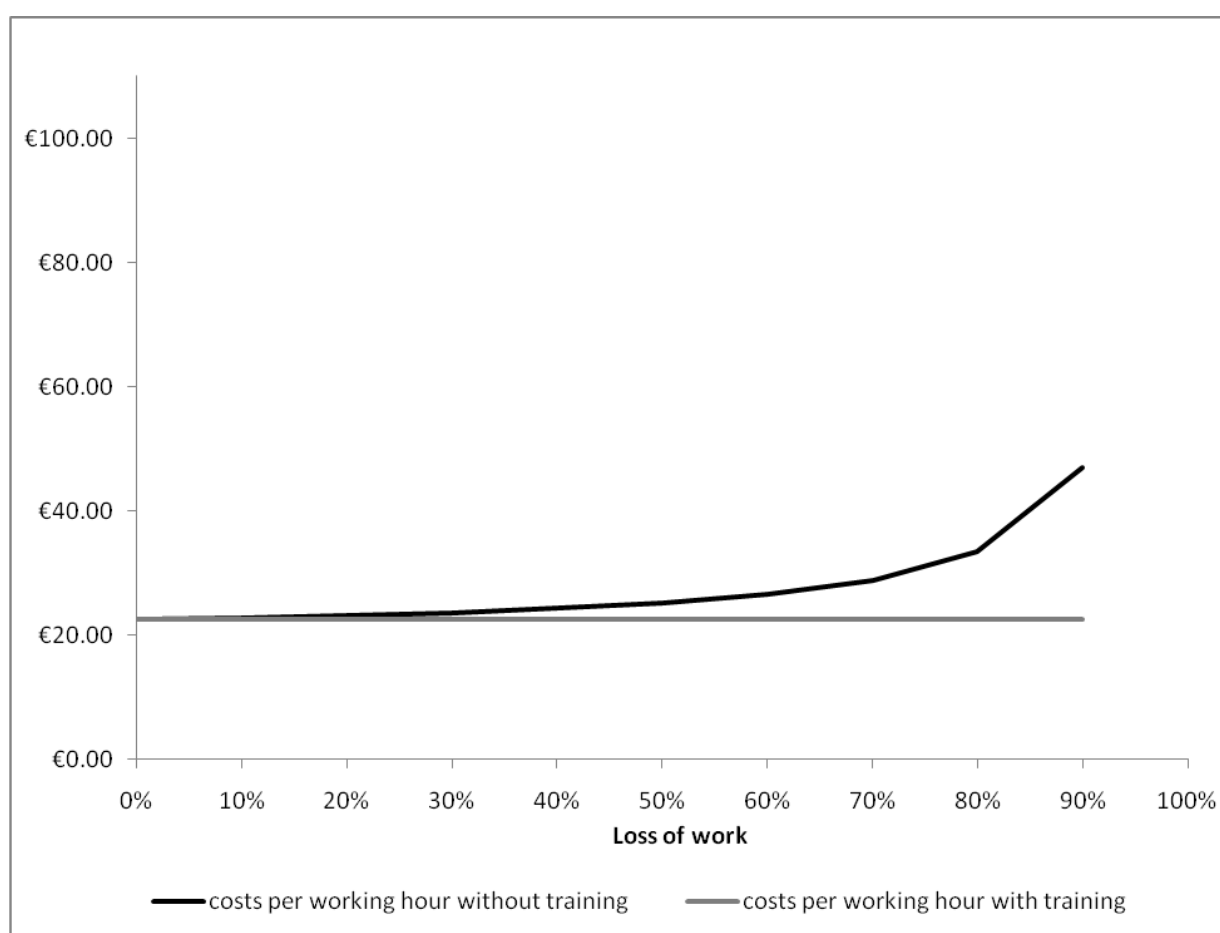
$$w = \frac{W}{L} = \underbrace{w_b \cdot (1 + s_{\text{work}})}_{\text{regular work}} + \underbrace{w_b \cdot \frac{(1 - L)}{L} s_{\text{loss}}}_{\text{short-time work}} \quad (4)$$

<sup>12</sup> Training must be certified by the employment agency and performed by an accredited provider.

For any hour actually worked, the employer has to pay the hourly gross wage  $w_b$  plus the corresponding share of contributions to social insurance  $s_{work}$ . For work sharing the employer also has to pay social contributions  $s_{loss}$  for the loss of work  $(1-L)$ , where  $L$  equals 0 for total loss of work and 1 for regular work. The amount of social contributions is linked to the wage rate for regular work  $w_b$  – according to working conditions *before* work sharing. As the social contributions for the loss of work are referred to the working hours performed, we have to divide the term through  $L$ .

Consequently, the burden of social contributions for work sharing depends on the base and the duration of work sharing. These determinants are referred to as  $s_{loss}$ . In addition, the hourly working costs are furthermore determined by the individual loss of work. This is indicated in the equation with  $(1-L)/L$ . With an increasing loss of work, the costs per hour increase disproportionately, and for a 100 per cent loss of work, they would become infinite. Hence there is no incentive for an excessive use of work sharing for the establishments.

**Graph 11: Costs per working hour while work sharing in relation to loss of work**



Source: Own calculations, based on fictitious figures.

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Despite the fact that work sharing in connection with job training can reduce labour costs significantly, some companies still prefer lay-offs to labour hoarding as a strategy. On the other hand, one should take into account dismissal costs like severance payments and costs for new recruitments as well. Specialized staff and highly skilled employees with job experience are hard to recruit from the external labour market. Their dismissal can be a significant loss of human capital for the company. As a consequence, companies will consider whether the expected costs for dismissals and new recruitments will be higher than those of work sharing. Establishments in substantial troubles might even not be able to afford work sharing. But the higher the qualification level of an individual employee, the higher are the opportunity costs of a dismissal (see section 2.1.1). As a rule we can state:

$\text{Work sharing} > \text{lay-offs if}$ $\text{expected costs of work sharing} + \text{additional costs} < \text{expected costs of fluctuation}$
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As the model illustrates, work sharing has a twofold impact on labour costs. Firstly, it reduces the current costs of work immediately and helps to stabilize the establishment. It is the more attractive the less work is lost. Secondly, it implies a sound motivation to abolish work sharing soon, as a single working hour is more expensive than under regular conditions. However, the model shows as well that work sharing is not very suitable for a long-lasting or even permanent loss of work.

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## 4. Empirical analysis

### 4.1 The use of work sharing

Since work sharing was not of much importance as an instrument of labour market policy until very recently, there is naturally not much empirical information available about its use or outcomes. On the basis of the IAB Establishment Panel<sup>13</sup> – a representative employer survey of employment parameters at individual establishments – we analyse how German establishments used work sharing in the past. The issue of work sharing has been surveyed in 2003, 2006 and 2009, the year of the economic and financial crisis. Table 3 shows the proportion of establishments using work sharing in 2003 and 2009.

**Table 3: Share of establishments Using work sharing (2003 and 2009)**

Establishment Size	2003	2009
Small establishments (1 to 49 employees)	2	4
Medium-sized establishments (50 to 249 employees)	5	15
Large establishments (250 and more employees)	5	20
All establishments	2	5

Source: IAB Establishment Panel 2003 and 2009.

For modelling the probability of work sharing in an establishment, we use the data from 2003 and 2009. Despite the longer distance in temporal terms, these data are more comparable than data from the boom year of 2006 (nonetheless models based on data from 2006 come to similar results). In addition, the 2003 panel wave also contains information on the establishments' attitude towards further training of staff. The following analyses provide an empirical verification of our theoretical considerations and contribute to the discussion of the modified and amended legislative framework for work sharing. In our multivariate probit models, we explore the probability of work sharing in an establishment (see Table 4). The models furthermore identify the significance of the analysed determinants.

<sup>13</sup> For more information on the IAB Establishment Panel, see Fischer et al. (2009) and Appendix 1.

**Table 4: Probit estimation for the probability of work sharing**

	2003	2009
Crisis indicator (d)	0.0184*** (0.006)	0.1280*** (0.009)
<b>Profit situation in previous year: bad</b> (Reference category)		
Profit situation in previous year: very good / good (d)	-0.0358*** (0.003)	-0.0686*** (0.006)
Profit situation in previous year: satisfactory (d)	-0.0313*** (0.003)	-0.0434*** (0.006)
Establishment size log	0.0086*** (0.001)	0.0323*** (0.002)
Exporting establishment (d)	0.0103** (0.005)	0.0651*** (0.009)
Share of university graduates among staff	0.0502*** (0.011)	-0.0679*** (0.021)
Share of qualified jobholders among staff	0.0188*** (0.007)	-0.0365*** (0.011)
Share of jobholders with fixed-term contracts	-0.0505 (0.031)	-0.0092 (0.034)
Share of part-time jobholders	-0.0436*** (0.011)	-0.1689*** (0.018)
Share of freelancers	-0.0446 (0.041)	-0.2302*** (0.084)
Use of temporary agency work in the first half of the year (d)	-0.0208*** (0.003)	-0.0542*** (0.005)
Establishment subject to collective agreements (d)	-0.0028 (0.004)	-0.0011 (0.006)
<b>Sector: manufacturing</b> (Reference category)		
Sector: mining / energy (d)	-0.0157** (0.006)	-0.0610*** (0.006)
Sector: construction (d)	0.0090 (0.006)	0.0069 (0.009)
Sector: service (d)	-0.0437*** (0.005)	-0.1111*** (0.008)
West Germany (d)	-0.0043 (0.004)	-0.0166*** (0.006)
Chi <sup>2</sup>	449.16***	1490.35***
PseudoR <sup>2</sup>	0.15	0.30
Cases	9703	9515

Note: \*/\*\*/\*\* indicate significance on 10/5/1%-level; estimation of marginal effects.

Values in brackets are heteroscedasticity-robust standard errors. (d) = dummy-variable.

Source: IAB Establishment Panel 2003 and 2009.

The first component of our analysis is a *crisis indicator*, which puts the expected development of the business in the year of the survey in relation to the same variable in the year before. The crisis indicator itself is a dummy variable with a value of 1 if a non-negative expectation of the previous year turned into a negative expectation for the year of the survey. This indicates that the establishment was just hit by the crisis and not already in trouble the year before. This is important as the legal conditions require an “unexpected, inevitable and temporary loss of work”. The analyses for both years show clearly that the



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prevalence of the crisis increases the probability of work sharing in an establishment. However, as Table 4 shows, this effect is much stronger in 2009.

The *profit situation* in the year previous to the survey is closely related to the crisis indicator and more or less just the reverse side of the same coin. Compared to a bad profit situation in the previous year, establishments have a lower probability of work sharing in the following year the higher their revenues in the year 2002 (respectively 2008) were. Work sharing is apparently rather an option for establishments with only low profits or even losses in the previous year.

The *establishment size* is included in the models as logarithmized total number of employees. More staff increases the probability of work sharing in both years. Larger establishments have different and more flexibility reserves than smaller ones. They also often have more capacities to organize alternative and flexible working processes. However, the new legislative amendments are aiming at easier access to work sharing also for smaller establishments.

Stiglitz (2009) regards the strongly export-dependent manufacturing sector as a German key industry mainly affected by the global economic and financial crisis. In accordance with this theoretical framework, export-orientation also increases the probability of work sharing both in 2003 and 2009. *Export* is also a dummy variable with a value of 1 for exporting establishments and 0 otherwise.

Establishments furthermore have a vital interest in keeping highly productive and capable employees with the company also in times of temporary labour slacks. Apart from lay-off costs like severance payments or other compensations, especially the loss of *human capital* is striking. Usually the re-recruitment of high potentials in external labour markets is more difficult than the hiring of rather lower-skilled workers. In contrast to this line of argumentation, in our estimations for 2009 a higher *share of qualified employees* does not lead to a higher probability of work sharing. The same holds true for establishments with a higher *share of university graduates*: in 2009, they are actually less likely to use work sharing. All estimations for 2009 show highly significant negative effects of the qualification level of staff. An explanation is that the crisis did not affect the German industry in general, but only a specific group of mainly export-oriented establishments. It seems that these are now making efforts to keep also blue-collar workers employed with help of *Kurzarbeit*.<sup>14</sup> This is in line with the fact that these establishments were hit by an exogenous shock and not by their own structural deficits. It furthermore indicates that they are expecting a quick recovery.

Among *flexibility strategies* which can be taken into account in our model we find *fixed-term contracting*, *part-time work*,<sup>15</sup> *freelancers and temporary agency work*. In case of a declining demand for labour it is likely that the establishment will rather preserve the core staff at the disadvantage of the more flexible and less protected groups of staff. In addition, one important condition of eligibility for STC is that “flexibility buffers” must have been utilised as far as possible before. Indeed, all observed types of flexibility buffers show a negative tendency on the probability of work sharing in both years. In accordance with the theoretical considerations work sharing has less importance for establishments which make use of temporary agency workers. Only in 2009 a higher share of freelancers also reduces the probability of work sharing. The share of staff with fixed-term contracts

<sup>14</sup> Nickell and Bell (1996, p. 20) argue that cuts in payroll taxes or job subsidies for the unskilled cannot be expected to play a major role in reversing the inexorable rise in aggregate unemployment, but they could make a contribution.

<sup>15</sup> In our model, part-time work is defined as less than 20 working hours per week.

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does not have a significant influence on the use of work sharing in 2003 or 2009. Establishments with a bigger share of part-time staff have a lower probability of using work sharing than establishments with less part-time jobs.

Establishments may also be bound by *collective agreements*. Collective agreements in Germany usually go hand-in-hand with the size of the establishment. As the regression models show, this does not have any influence on the probability of work sharing. In several branches of industry, collective contracts guarantee additional payments for employees in work sharing. This again increases the costs of work sharing and imposes a disadvantage. At the same time, establishments without such obligations due to collective agreements can react more flexible.

For the analysis of the influence of the *industrial sector*, we use the manufacturing industry as a reference category. The sectors are included in the model as dummy variables. They have the value 1 if an establishment is located in a certain sector, otherwise the value is 0. Due to small numbers of cases, agriculture and public administration are excluded from the analyses. For both 2003 and 2009, establishments in the mining or the energy sector have a lower probability of work sharing than in the manufacturing industry; in the construction sector, work sharing was insignificant both in 2003 and 2009. In the service sector, the probability of work sharing is clearly lower than in the reference category in both years. Work sharing was of high importance for the manufacturing industry in 2003 as well as in 2009.

As a standard, we control for *East and West Germany* in our model.<sup>16</sup> Whereas the location of the establishment did not play a role for the probability of work sharing in 2003, this changes in 2009. Despite the fact that work sharing is mostly found in West Germany, our multivariate analyses show that establishments in West Germany have a lower probability of work sharing in 2009.

As a first conclusion, we find that the situation in 2009 differs from 2003. The current crisis has some specific features. In the present situation, the German manufacturing industry is suffering even more from the crisis than in the past. But interestingly, not all establishments of this sector are affected in the same way. Despite the fact that the largest part of this branch of industry is found in West Germany, the location of the establishment in these regions has a negative effect on the probability of work sharing. This indicates that the crisis is not generally related to whole regions but rather to a number of selected establishments with specific characteristics. However, the biggest surprise is the role of qualified employees and university graduates among the staff. Whereas a higher share of university graduates increased the probability and intensity of work sharing in the past, it is now just the opposite. An explanation is that the crisis reached first production-intense establishments with a higher share of less qualified or low-skilled staff.

## 4.2 Further training while work sharing

One of the latest innovations in Germany concerning work sharing is the subsidy of training on the job while working short-term (see Table 1). Since there is not yet any empirical data available for the current situation, we again use the 2003 survey wave of the

<sup>16</sup> According to the regional classification of the 2003 IAB Establishment Panel, East Berlin is accounted to East Germany, whereas West Berlin is regarded as a part of West Germany.

IAB Establishment Panel<sup>17</sup> to analyse the efforts of establishments to use periods of work sharing for further training on the job.

As Table 5 shows, most establishments did not take much interest in providing further training for employees in work sharing in the first half of 2003. Only 12 per cent of those establishments providing further training for their staff at all offered training schemes as well for their participants in work sharing. All in all, only 5 per cent of all establishments with work sharing provided additional further training for their participants in work sharing. Among those establishments which did not provide any further training for their staff at all, the percentage of those who offered further training for work-sharing participants was even lower at 2 per cent. However, one has to take into account that the situation of establishments in 2003 was different from today; in 2003, financial support for further training while work sharing was only possible under certain restrictive circumstances. As a consequence, the objectives of those training schemes were presumably different from today's goals. Nonetheless we find indications that further training while work sharing is still not of much importance for establishments. In 2009, establishments with work sharing requested only a share of 17 per cent of the financial budget the Federal Employment Agency provided especially for further training while work sharing. In relation to the total annual budget for work sharing in Germany this was less than 1 per cent.

**Table 5: Further training of employees in general and participants of work sharing: Share of establishments with work sharing in % (first half of 2003)**

	Further training of employees in general	No further training of employees in general	Total
Establishments with further training while work sharing	12	2	5
Establishments without further training while work sharing	88	98	95
Total	100	100	100

Source: IAB Establishment Panel 2003.

The expected returns on training investments are uncertain for establishments. Participants might be reluctant or simply not capable (Leber, 2009). Furthermore, employees who participated in company-financed training courses might leave the establishment before the investment has amortized. These uncertainties appear to be bigger when the economy is declining. Consequently, the German government now subsidizes costs of further training while work sharing (see Table 1). Then again, generous subsidies and grants for further training increase the possibility of deadweight effects. Under these conditions, establishments might even be encouraged to invest into further training without any regards of expected returns. This would be efficient as long as the training costs are lower than the costs being saved instead for social contributions while work sharing. This incentive disappears from the seventh month of work sharing, as the Federal Employment Agency will cover the social contributions for the loss of work then anyway. As a consequence, establishments have not much interest in training measures with a duration of more than six months.

For a first descriptive overview, we differentiate between establishments by size. Small establishments have less than 50 employees, medium-sized ones have between 50 and 249, and establishments with 250 and more employees are referred to as large ones. Five per cent of all establishments with work sharing in the first half of 2003 implemented

<sup>17</sup> The above-mentioned survey wave of 2006 contains questions about work sharing but not about training measures while receiving STC.

further training for their short-time workers. As Table 6 shows, such measures were much more popular among large establishments than among small or medium-sized ones. One-third of establishments with work sharing actively supported training courses for their staff in general in the first half in 2003. Again we observe a strong influence of the firm size. The cross-tabulation furthermore shows that 4 per cent of all establishments with work sharing also organized training measures for the staff and for those employees participating in work sharing.

**Table 6: Establishments with further training while work sharing in % (first half of 2003)**

	Share of establishments with work sharing in first half of 2003		
	<i>Further training of work-sharing participants</i>	<i>Further training of employees in general</i>	<i>Further training of both work-sharing participants and non-participants</i>
Small establishments (1–49 employees)	5	27	4
Medium-sized establishments (50–249 employees)	4	72	4
Large establishments (250 and more employees)	17	89	15
All establishments	5	32	4

Source: IAB Establishment Panel 2003.

In general, larger establishments are more likely to invest in human capital than small or medium-sized ones: the higher the staff's qualification level, the higher an establishment's propensity to support further training. This human resource strategy is obviously also as well applied to participants in work sharing. Compared to small establishments, the larger ones have more demand for further training, but also have other options to find skilled personnel.

More detailed analyses of the empirical data show that establishments do not go for half-measures once they have decided to go for further training while work sharing: small establishments include 80 per cent of work-sharing participants in such trainings, whereas medium-sized or large establishments train about 50 per cent of their short-time workers. Of course with a small number of staff, a small number of participants can even amount into a high training ratio. Small, medium-sized or large establishments with work sharing have one thing in common: they would rather support training for work-sharing participants than other staff. One reason might be the financial support through the Federal Employment Agency. Secondly, more participants in one training measure can also increase the economies of scale. And, last but not least, further training may be implemented easier in times with reduced workload.

To verify the descriptive results and to test our hypotheses, we use a probit model to estimate the probability that an establishment supports further training for its work-sharing participants. Parallel to that, we analyse by means of a fractional logit model the extent of training measures for the work-sharing participants (Table 7). For the latter model, the dependent variable is the share of participants in further training among all work-sharing participants in the establishment. We only use the IAB-Establishment Panel 2003 as a data source for these analyses. Since qualification while work sharing has not been used much in 2003, the number of cases is considerably smaller compared to the sample used for the probit estimations presented in Table 4.

As already mentioned, we distinguish between East and West Germany. The probability of further training while work sharing is slightly higher in East Germany, but the location of an establishment does not have significant influence on the share of participants who get further training while work sharing.

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The *qualification level of staff* is categorized threefold. Compared to the share of university graduates among staff, higher shares of both qualified jobholders or low-qualified jobholders decrease the probability of further training while work sharing significantly. The fractional logit estimation shows basically the same effects, but with less significance. This is a strong indicator for the existence of a mechanism that is referred to as “Matthew Principle” in Germany: “For unto every one that hath shall be given ...” (Book of Matthew 25:29). Put differently, a higher qualification level increases the probability of work sharing (see Table 4), the probability of further training while work sharing, and the share of work-sharing participants who get further training while work sharing.

*Non-standard or atypical employment* is a newly created variable which contains temporary work, fixed-term contracts and part-time work which could not be put into the analysis due to small numbers of cases. Establishments have a tendency to protect their core staff at the expense of peripheral staff or a contingent workforce. As long as there are still flexibility reserves (e.g. in the form of atypical employment), further investments in the human capital of the staff have a fair chance to pay off. In case of a longer lasting loss of work, lay-offs become more relevant. In that case atypical employment would be reduced first as the lay-off costs for those jobholders are lower than for the regularly employed staff. Consequently, atypical employees have a lower probability to participate in further training while work sharing as there is sound reason that such investments into their human capital would not pay off. As the probit model shows, a higher share of atypical employment increases the probability of further training while work sharing. The fractional logit estimation furthermore indicates that this determinant as well increases the total share of participants in further training while work sharing. Lay-offs of training participants are avoided, as there is still a stock of atypical employees which can be reduced if there is need for even more flexibility. Evidently a higher share of atypical employment increases both investments in and intensity of further training while work sharing.

Not all establishments are able to provide further training of staff in difficult economic situations. Therefore investments in human capital will be less likely if the economic future is uncertain. In fact, *stronger variations of the course of business in the previous year* reduce the probability of further training while work sharing. The fractional logit estimation indicates that further training while work sharing takes place on a smaller scale if the economic situation of the establishment is less stable.

The potential influence of a higher *share of participants in work sharing among staff* on the probability of further training while work sharing is ambivalent. On the one hand, the descriptive statistics presented in Table 6 indicate that training measures are easier to organize if there is a larger number of potential participants available. On the other hand, the additional costs induced by work sharing could restrict the financial scope for further training. As we learn from the probit estimation, the share of work-sharing participants does have a positive influence on the probability of further training while work sharing. In fact, it does not influence the share of participants among those receiving STC.

The descriptive analysis displayed in Table 6 furthermore shows that there is some correlation between *qualification measures in general* and further training while work sharing. As a consequence, one can expect that those establishments with more qualification efforts in general are more likely to provide further training for their work-sharing participants as well. Indeed, both probit estimation and fractional logit estimation show that the probability of further training while work sharing is significantly higher if an establishment generally goes for qualification of staff.

*Collective agreements* might cover as well qualification measures in general and further training while work sharing. Both trade unions and employers have a common

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interest in the improvement of jobholders' human capital. Nevertheless, the influence of collective agreements on the probability of further training while work sharing is still unclear. In some industrial sectors, we find amendments to the collective agreements which guarantee additional payments for work-sharing participants to cover the net wage difference due to the loss of work (Bach and Spitznagel, 2009). In case of further training while work sharing, these additional payments are not granted because otherwise the Federal Employment Agency would not subsidize the training courses. The potential influence of such amendments to collective agreements is therefore double-faced: with further training while work sharing, employers can reduce their expenditures for wages, additional payments and qualification measures. Jobholders in contrast would receive less money if they participate in training courses while work sharing. The empirical analysis shows a higher probability of further training while work sharing if the establishment is bound by collective agreements. But collective agreements do not influence the share of participants.

In Germany, *works councils* have considerable influence on management decisions.<sup>18</sup> They have a legal claim on information and counselling under codetermination; for instance, the works council of an establishment could apply for STC at the employment agency. The works council could as well propose further training while work sharing to the management. Despite these facts, works councils do not have any significant impact on the probability and intensity of further training while work sharing. One explanation might be that mere protection of employment has a higher priority for the works council than further training. Furthermore, the works council first and foremost represents the interests of the current staff. As mentioned above, the participation in further training while work sharing can reduce individual payments and compensations under certain circumstances.

The descriptive analysis presented in Table 6 points out that *larger establishments* are generally more likely to invest in human capital. They have more demand for further training than smaller establishments and, at the same time, have more options to satisfy these needs. Compared to large establishments with 250 and more employees as a reference category, the small (5 to 49 employees) and medium-sized ones (50 to 249 employees) have a lower probability to offer further training while work sharing. Additionally, the fractional logit estimation shows a lower intensity of further training among small and medium-sized establishments. These effects are not significant for small establishments, but at least the sign of the coefficient is indicating the direction of a potential influence.

Last but not least, both estimation models control for the influence of the *industrial sector*. Despite the mining and energy sector which has a higher probability of further training while work sharing than the reference category "manufacturing industry", the results of both probit and fractional logit estimation are insignificant for all other sectors. As mentioned above, the current situation is not completely comparable to 2003. Today the strongly export-dependending manufacturing sector, which is regarded as a German key industry affected by the global crisis (Stiglitz, 2009), should play a more prominent role and hence generate more significant effects.

<sup>18</sup> In Germany, an establishment must have at least five employees to install a works council. Hence we exclude establishments with less than five employees from the analyses.

**Table 7: Probit estimation for the probability of further training while work sharing and fractional logit estimation for the share of participants of further training while work sharing**

Variable	Probit	Fractional logit
West Germany (d)	-0.0347* (0.02)	-0.0089 (0.01)
Share of qualified jobholders among staff	-0.1517*** (0.05)	-0.0732** (0.03)
Share of low-qualified jobholders among staff	-0.1455*** (0.06)	-0.0664* (0.04)
Non-standard / atypical employment	0.0956*** (0.03)	0.0322* (0.02)
Stronger variation of course of business in 2002 (d)	-0.0452** (0.02)	-0.0342** (0.02)
Share of participants in work sharing among staff	0.0648** (0.03)	0.0183 (0.02)
Further training of employees in general (d)	0.0812*** (0.02)	0.0339*** (0.01)
Establishment bound by collective agreements (d)	0.0402** (0.02)	0.0136 (0.01)
Establishment with works council (d)	0.0263 (0.02)	0.0134 (0.02)
Establishment size:		
- Large (Reference) (250 and more employees)		
- Medium (50 - 249 employees) (d)	-0.0395** (0.02)	-0.0198* (0.01)
- Small (5 - 49 employees) (d)	-0.0375 (0.03)	-0.0140 (0.02)
Sector:		
- Manufacturing industry (Reference)		
- Construction (d)	0.0388 (0.03)	0.0290 (0.02)
- Service (d)	0.0024 (0.03)	0.0124 (0.02)
- Mining / Energy (d)	0.2870* (0.17)	0.1340 (0.13)
Chi <sup>2</sup>	55.39***	49.22***
Pseudo-R <sup>2</sup>	0.23	
Cases	564	564

Note: \*/\*\*/\*\* indicate significance on 10/5/1%-level; estimation of marginal effects.

Values in brackets are heteroscedasticity-robust standard errors: (d) = dummy-variable.

Non-standard/atypical employment consists of temporary agency work, fixed-term contracts and part-time work.

Source: IAB Establishment Panel 2003.





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## 5. Conclusions: What's ahead?

Compared to the first half of 2008, the German economy faced a decline in GDP of 6.8 per cent in the first six months of 2009. With a total labour force of about 40 million, this share would amount to a projected loss of 2.7 million jobs – given constant working hours and constant productivity per working hour. Taking into account an average increase of the productivity per working hour of about 1.3 per cent per year, the estimation would be rather worse as this would be equivalent to another 0.5 million jobs lost. All in all, a total of approximately 3.2 million jobs in Germany would be redundant due to the economic crisis (Möller and Walwei, 2009). However, up to now, employment has remained stable in Germany. Möller and Walwei (2009) explain the “German Wunder” with two crucial factors. Firstly, German establishments obviously practised labour hoarding throughout the last year. This has been put into practise by a general reduction of working hours, a reduction of overtime, a reduction of surpluses in working time accounts and *Kurzarbeit*. Secondly, they reduced the work intensity of the remaining working hours in terms of lower productivity.

Work sharing has enabled German establishments to avoid layoffs and to practice “flexibility by hours” instead of “flexibility by numbers” as a human resource strategy. As a compensation for the reduction of working hours due to unavoidable loss of work, they receive short-time working compensation (“*Kurzarbeitergeld*”) from unemployment insurance, which is passed on to employees according to their individual wage reductions.

The average number of participants in work sharing in the year 2009 amounts to about one million. With an average loss of work of 30 per cent, this equals 300,000 full-time jobs (Bundesagentur für Arbeit, 2010). The German Federal Employment Agency spent around 5 billion euros for the protection of these jobs: put simply, the public purse would spend a theoretical average of 16,667 euros for each job saved. However, this is a both static and even a naïve view of the issue. As labour cannot be divided infinitely, the establishments would presumably have started to lay off staff without STC at a much earlier stage. For the time being, one can conclude that work sharing has saved numerous jobs in Germany.

However, this is still the rough macro perspective. At present, neither information on the establishment level nor on the individual level is available. A micro-level evaluation would require data on the whereabouts of the establishments and their employees. Consequently, it is still not clear if work sharing saved establishments from the crash or individuals from being fired. The success of work sharing will depend on the future economic development. In the long run, mere *Kurzarbeit* cannot save jobs if there is no longer demand for employment in the establishment. Work sharing may well be helpful if lack of work is transitory. But if structural transformation is unavoidable, it will just be deferred by such interventions. Thus, two elements are of crucial importance for minimizing the negative side-effects of work-sharing programmes: the subsidy should be temporary and well-targeted.

Further training while work sharing in Germany could not yet show any significant impact. Even generous financial support could not motivate many establishments to provide training courses for their work-sharing participants. It seems that the general attitude of an establishment towards investments in human resources is more decisive than financial incentives. At the same time, this shows the limits of work sharing: it might help to overcome a temporary loss of work, but it is surely not a panacea against a structural crisis.

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Work sharing might lose its ability to absorb the shock waves of the crisis in the course of time. Labour costs are still high for establishments even with *Kurzarbeit*. If the crisis lasts much longer, the flexibility buffers will be exhausted one day. Lay-offs would become unavoidable in that case. For German industry, it might then be that international competitors adjusted faster to the new situation as they laid off their staff earlier. Put differently, if the course of the economic crisis is V-shaped (i.e. a deep, but short cut), work sharing has a fair chance to save jobs. But if the crisis is L-shaped (i.e. deep, but also long-lasting), work sharing would end up in unavoidable unemployment anyway and could even hamper necessary structural changes.

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## References

- Adecco Institute (2008): *Die Demografische Fitness Umfrage 2008: Demografische Fitness deutscher Unternehmen in Zeiten der Krise* (London), available at [http://institute.adecco.com/Research/Articles/Documents/2008\\_Germany\\_German\\_DieDemografische.pdf](http://institute.adecco.com/Research/Articles/Documents/2008_Germany_German_DieDemografische.pdf) [accessed 21 January 2010].
- Bach, H.-U. and E. Spitznagel (2009): “Kurzarbeit: Betriebe zahlen mit und haben was davon”, in *IAB-Kurzbericht*, 17.
- Bach, H.-U., M. Hummel, S. Klinger, E. Spitznagel and G. Zika (2009a): “Arbeitsmarkt-Projektion 2010: Die Krise wird deutliche Spuren hinterlassen”, in *IAB-Kurzbericht*, 20.
- Bach, H.-U., A. Crimmann, E. Spitznagel, and F. Wießner (2009b): “Kurzarbeit: Atempause in der Krise”, in *IAB-Forum Spezial*, pp. 52-63.
- Backes-Gellner, U., E.P. Lazear and B. Wolff (2001): *Personalökonomik : fortgeschrittene Anwendungen für das Management* (Stuttgart, Schäffer-Poeschel).
- Balducchi, D. and S. Wandner (2008): “Work Sharing Policy: Power Sharing and Stalemate in American Federalism”, in *Publius*, 38 (Winter), pp. 111-136.
- Becker, G.S. (1964): *Human Capital: A Theoretical and Empirical Analysis with Special Reference to Education* (Chicago, The University of Chicago Press).
- Behringer, F. D. Moraal, and G. Schönfeld (2008): “Betriebliche Weiterbildung in Europa: Deutschland weiterhin nur im Mittelfeld”, in *Berufsbildung in Wissenschaft und Praxis*, 37(1), pp. 9-14.
- Bundesagentur für Arbeit (2010): *Der Arbeits- und Ausbildungsmarkt in Deutschland: Monatsbericht Dezember und Jahr 2009* (Nürnberg).
- Crimmann, A. and F. Wießner (2009): “Wirtschafts- und Finanzkrise: Verschaufpause dank Kurzarbeit”, in *IAB-Kurzbericht*, 14.
- Crimmann, A., J. Möller, M. Stops and U. Walwei (2009): “Kurzarbeit: Wann und wie lange lohnt sie sich? ”, in *IAB-Forum*, 2, pp. 104-111.
- Eichhorst, W. and P. Marx (2009): “Kurzarbeit: Sinnvoller Konjunkturpuffer oder verlängertes Arbeitslosengeld? ”, in *IZA Standpunkte*, 5.
- European Foundation for the Improvement of Living and Working Conditions (2009): *The European Company Survey – First Findings*, document no. EF/09/97/EN (Dublin), available at <http://www.eurofound.europa.eu/pubdocs/2009/97/en/1/EF0997EN.pdf> [accessed 21 January 2010].
- Fischer, G., F. Janik, D. Müller and A. Schmucker (2009): “The IAB-Establishment Panel: Things Users Should Know”, in *Schmollers Jahrbuch*, 129(1), pp. 133-148.
- Fritsche, U. (2009): “Krise, Arbeitsmarkt, Erholung: Was kommt auf uns zu? ”, in *Wirtschaftsdienst*, 12, pp. 778-779.
- Kölling, A. (2000): “The IAB Establishment Panel”, in *Schmollers Jahrbuch*, 120(2), pp. 291-300.

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- Leber, U. (2009): "Betriebsgröße, Qualifikationsstruktur und Weiterbildungsbeteiligung. Ergebnisse aus dem IAB-Betriebspanel", in *Zeitschrift für Berufs- und Wirtschaftspädagogik – Beihefte*, 22, pp. 149-168.
- Messenger, J. (2009): *Work Sharing: A Strategy to Preserve Jobs during the Global Jobs Crisis*, TRAVAIL Policy Brief No. 1 (Geneva, ILO).
- Möller, J. and U. Walwei (2009): "Krisenanalyse und Empfehlungen: Das deutsche Arbeitsmarktwunder auf dem Prüfstand", in *IAB-Forum Spezial*, pp. 4-11.
- Nickell, S. and B. Bell (1996): *Would Cutting Payroll Taxes on the Unskilled have a Significant Impact on Unemployment?*, Discussion Paper No. 276 (London, Centre for Economic Performance).
- OECD (2009): *OECD Economic Outlook 86 Projection* (Paris).
- Schwengler, B. and V. Loibl (2010): "Aufschwung und Krise wirken regional unterschiedlich", in *IAB-Kurzbericht*, 1.
- Stiglitz, J. (2009): "The Global Crisis, Social Protection and Jobs", in *International Labour Review*, 148(1-2), pp. 1-13.
- Vroman, W. and V. Brusentsev (2009): *Short-Time Compensation as a Policy to Stabilize Employment* (Washington, Urban Institute), available at [http://www.urban.org/UploadedPDF/411983\\_stabilize\\_employment.pdf](http://www.urban.org/UploadedPDF/411983_stabilize_employment.pdf) [accessed 21 January 2010].
- Wandner, S. (2008): "Employment programs for recipients of unemployment insurance", in *Monthly Labor Review*, 131(10), pp. 17-27.

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## Appendix 1: A side note to the IAB Establishment Panel<sup>19</sup>

### Introduction

The IAB (Institute for Employment Research) Establishment Panel is an annual survey of establishments and is unique in Germany, as it represents all industries and establishment sizes nationwide and can also be analysed on a longitudinal basis. The survey with personal interviews started in West Germany in 1993, with the aim of building up a representative information system for continuous analysis of labour demand. It has been carried out in East Germany since 1996, making it a nationwide survey. The IAB Establishment Panel is conceived as a longitudinal survey, i.e. a large majority of the same establishments are interviewed every year. Consequently, it enables both analysis of developments across time through comparison of cross-sectional data on different points in time, and also longitudinal studies of individual establishments. Approximately 16,000 establishments currently are surveyed in the IAB Establishment Panel on a large number of employment policy-related subjects, including employment development, business policy and business development, investment activities, innovations in the establishment, public funding, personnel structure, vocational training and apprenticeships, new and existing personnel, recruitment, wages and salaries, working times in the establishment, further training and general data on the establishment. The survey also includes varying focal topics every year.

### Sample design

The population of the IAB Establishment Panel consists of all establishments with at least one employee qualifying for social security as of 30 June of the previous year. The basis for sampling is the establishment file of the Federal Employment Agency, which is created on a quarterly basis and contains some two million establishments. The establishment file contains all establishments that notify the social security agencies of their employees as required.

### Sampling process

The sample for the IAB Establishment Panel is drawn from the establishment file as of 30 June of the previous year, because the information on social security notifications is only available approximately six months after the respective reference date.

For the purpose of drawing the sample, the target values for the net sample are established in dependence on the financed interviews on the federal state (*Bundesländer*) level and for the manufacturing industry in East Germany. For these 17 partial samples (since 2003), a target degree of completeness is set for every cell of the stratification matrix (17 industries and ten establishment size classes) according to the “principle of optimum stratification”. As a result, large establishments, small federal states, and small industries and the manufacturing industry in East Germany are overrepresented.

<sup>19</sup> For more details see, for example, Fischer et al. (2009) and Kölling (2000).

## Appendix 2: Means and standard deviation of independent variables in Table 4

	2003		2009	
	Mean	Std. Dev	Mean	Std. Dev
Crisis indicator (d)	0.130	0.336	0.243	0.429
Exporting establishment (d)	0.228	0.420	0.249	0.432
Sector: mining / energy (d)	0.022	0.145	0.025	0.156
Sector: construction (d)	0.098	0.298	0.091	0.288
Sector: service (d)	0.594	0.491	0.602	0.490
Share of university graduates among staff	0.088	0.185	0.089	0.184
Share of qualified employees among staff	0.563	0.284	0.570	0.280
Establishment size (log.)	3.226	1.791	3.106	1.765
Use of temporary agency work in the first half of the year (d)	0.114	0.318	0.122	0.327
Share of free-lancers	0.011	0.068	0.013	0.076
Share of employees with fixed-term contracts	0.047	0.133	0.052	0.132
Share of part-time employees	0.196	0.243	0.215	0.248
Profit situation in the previous year: very good/good (d)	0.269	0.443	0.430	0.495
Profit situation in the previous year: satisfactory (d)	0.340	0.474	0.333	0.471
West Germany (d)	0.643	0.479	0.616	0.486
Establishment subject to collective agreements (d)	0.517	0.500	0.452	0.498

Source: IAB Establishment Panel 2002-2009.