Temporary Employment and the Global Crisis

Lutz Bellmann, Hans-Dieter Gerner, Christian Hohendanner

Institute for Employment Research, Nuremberg and Friedrich-Alexander University of Erlangen-Nuremberg

prepared for

Increasing Labor Market Flexibility – Boon or Bane?

IAB International Workshop - in cooperation with LASER, March 18 - 19, 2011

preliminary version, not to quote

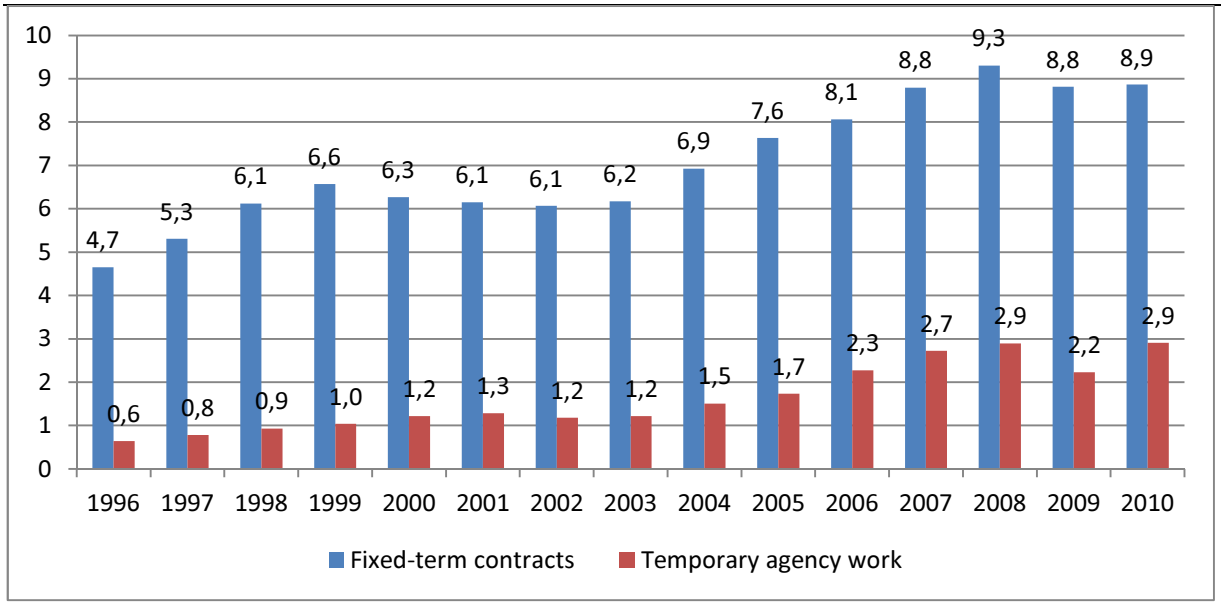
Abstract

Two motives to deploy fixed-term contracts (FTCs) and temporary agency work (TAWs) are discussed: adjustment to economic volatility (flexibility) and strategic use independently of economic discontinuity. The exogenous shock of the international economic crisis gives us the opportunity to shed light on these motives behind the deployment of temporary employment in Germany. By comparing crisis and non-crisis plants within the production sector the extent of the flexibility function of temporary employment becomes apparent. Furthermore, we analyse FTCs and TAWs separately to investigate whether there are differences in the cycle effects between the two types of employment. We apply difference-in-difference methods to analyse time-trends within the two types of employment. Using the IAB Establishment Panel 2006 to 2010, our observation period encompasses the economic upswing (2006 to 2008), the crisis (2009) as well as the recovery (2010). We find clear evidence for a pro-cyclical flexibility function of temporary employment. However, our results reveal a strategic use of temporary employment as well.

1. Introduction

In the years 2008/9 many countries all over the world and also Germany experienced the deepest recession since the Great Depression in 1929. Although Germany was hit by the crisis very hard in terms of the decline in GNP, the overall employment effect was relatively small between 2008 and 2009. Despite the relative stability of the German labour market in the aggregate, Germany faced a reduction in temporary agency and - to a smaller extent - fixed-term employment during the crisis (Eichhorst et al. 2010; Hohendanner 2010). Since the recession was unexpected as well as exogenous for the German economy, it gives us the opportunity to analyse the differences between fixed-term contracts (FTC) and temporary agency work (TAW) regarding their economic adjustment function. Both types of employment reduce overall labour costs.

Figure 1: Proportions of FTCs and TAWs among socially insured employees between 1996 and 2010



Source: FTCs: IAB-Establishment Panel, TAWs: Federal Employment Agency

Before the occurrence of the global crisis almost half of all recruitments in German firms were based on a fixed-term contract (Hohendanner 2010). Affected firms were expected to dismiss most of their fixed-term and temporary agency employees during the economic downturn (Giesecke & Wotschack 2009)[1]. Indeed, many FTCs in the affected firms have not been renewed in the crisis (Hohendanner 2010). However, the number of FTCs decreased only about six per cent between 2008 and 2009. Moreover, FTCs increased only slightly in the economic recovery between 2009 and 2010 (see figure 1). Contrary to the slight change of FTCs, the variation was much higher for TAWs. The number of TAWs fell from 823,101 in July 2008 to 580,092 in April 2009 and rose again to approximately 900,000 in September 2010 (Federal Employment Agency 2011). This notable variation is only partially caused by one of the prerequisites of the German short-time work allowance program[2] (Crimmann et al. 2010), which was used by 64,000 establishments and 1,500,000 employees in June 2009, because this prerequisite was abandoned in March 2009.

The remarkable difference in the aggregate development of both employment types before, during and after the crisis motivates our paper. The exogenous shock of the crisis gives us the opportunity to shed light on the motives behind the deployment of temporary employment. By comparing crisis and non-crisis plants the extent of the flexibility function of temporary employment becomes apparent. Furthermore, we analyse FTCs and TAWs

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[1] Due to the fact, that temporary employees are mainly young people and employees in the production sector are mainly men, young men are hit hardest during the economic downturn (Verick 2009).

[2] Eligibility for the short-time work allowance was linked to the dismantling of the firm's stock of temporary agency workers. Short time work is a labour market instrument in Germany, financed by the Federal Employment Agency. The basic idea of this policy instrument is that employers reduce the working time of their employees, if they are faced with a strong negative demand shock for example. Simultaneously the wages are reduced in proportion to the cut in hours worked (usually!). The employers get around 60 percent of the difference between the net income before and the net income after the working time reduction from the German Federal Employment Agency. Basically, besides the gross income for the hours still worked, the employers have to pay the full social security contribution for the employees' income before the cut in working time has taken place. The maximum duration f short time work is 24 months.

separately to investigate whether there are differences in the cycle effects between the two types of employment. The basic empirical research question is: Are there effects of the crisis in the incidence and intensity in the usage of the two types of employment after controlling for several intervening variables in Germany? Our observation period encompasses the economic upswing (2006 to 2008), the crisis (2009) as well as the recovery (2010). For this reason, we additionally examine whether there is a general cyclical pattern in the usage of TAWs and FTCs. They provide not only flexibility in order to circumvent EPL but also offer strategic advantages to increase efficiency and profits (e.g. by increasing the work effort and lowering overall labour costs) (Engellandt & Riphahn 2005; Dolado & Stucchi 2008; Holst et al. 2010). While there is some empirical evidence for the different development on the aggregate level, this is – according to our best knowledge - the first paper to analyse the patterns of adjustment behaviour on the firm level.

In our analysis we use the IAB Establishment Panel survey data and compare the change in the number of employees and firms with FTCs and TAWs in crisis and non crisis plants during the first half of the years 2006 to 2010. Whether an establishment is subject to the economic crisis, we identify by a subjective indicator provided by the IAB Establishment Panel 2010[3]. We restrict our analyses on the production sector because in Germany services were hardly affected by the crisis (Hohendanner 2010; Bellmann & Gerner 2011). We apply conditional difference-in-difference estimates in order to identify differences in the time-trends in crisis and non-crisis plants accounting for observed and unobserved firm heterogeneity.

[3] Firms' representatives were directly asked whether they were subject to the global crisis or not.

The rest of the paper is structured as follows: After a short description of the institutional background we will review the relevant literature and develop our hypotheses. Then, we describe the IAB Establishment Panel Survey, the definition of our key variables, and present our empirical analysis. Our last section concludes.

2. Hypotheses

Since the advent of the recession in 2008, many companies have faced a dramatic decline in demand for their products and services. The way these companies respond, depends on the severity of the recession as well as on their short-term and long-term expectations. Cost cutting measures are of utmost importance for the firms (Eurofound 2009; Heckmann et al. 2009). Strategies to reduce costs mainly consist of different measures to decrease the level of production with the consequence of reduced working time and measures to decrease wage costs. According to the study of Bell and Blanchflower (2009) using OECD macroeconomic data Germany was hit by the global crisis very hard in terms of the decline in GNP, the overall employment effect, however, was relatively small between 2008 and 2009[4].

One reason for this phenomenon may be that in Germany, especially the export oriented industries like automotive or mechanical engineering are most badly affected. In these sectors the proportion of qualified workers is high and hence the investments in human capital, which could explain labour hoarding at the firm level (Bellmann & Gerner 2011).

[4] As already mentioned, in the light of severity of the crisis, economists estimated for Germany a potential job loss of 3.2 million employees in the 1st half of 2008 compared to the 1st half of 2009 (Möller & Walwei 2009: 6).

Another reason may be that in Germany labour adjustment via regular firings is restricted due to the employment protection legislation (EPL) in combination with the work council legislation (WCL) and collective agreements (CA). The EPL system is regarded as a central institutional pillar to explain the German 'job miracle' (Möller 2010)[5].

However, the German employment regime is characterized as a two-class employment system with regular, well-protected employees on the one hand, and temporary employees on the other (OECD 2010)[6]. Temporary contracts differ from permanent contracts with respect to firing costs at the time of contract expiry. Fixed-term contracts and temporary agency work can be used to avoid the institutional restriction of regular layoffs. Empirical analyses e.g. show that the EPL as well as the existence of work councils have a positive impact on the usage of fixed-term employment (Boockmann & Hagen 2003; Pfeifer 2005). In Germany FTCs and TAWs are used as an adjustment means in the context of economic discontinuity (Kaiser & Pfeiffer 2001; Hagen & Boockmann 2002; Boockmann & Hagen 2003; Hagen 2003; Bellmann 2004; Meyer & Pfeifer 2005; Pfeifer 2005; Pfeifer 2006; Bellmann et al. 2009).

There are some major differences between both types of employment that could partly explain the differences in the adjustment process during and after the crisis. As previously mentioned, FTCs differ from permanent contracts with respect to firing costs at the time of contract expiry. However, there are rather no differences to permanent employment in

[5] The difference between the more stringent German EPL and the more relaxed EPL in the liberal market-economies like the US was often seen as contributing to higher unemployment in Germany before crisis (Lazear 1990).

[6] For a similar discussion for France and Spain see Bentolila et al. (2010)

search and hiring costs[7]. By contrast, temporary agency work differs also with respect to search and hiring costs, since the temporary work agency takes over search costs and some of the bureaucratic costs of personnel recruitment (Boockmann & Hagen 2001). Furthermore, empirical analyses identify lower wages for both types of employment in Germany (Kvasnicka & Werwatz 2002; Mertens et al. 2007).

However, there are differences in the adjustment speed as regards layoffs of FTCs and TAWs. While employment protection during the contract period for FTCs is restrictive and employers cannot lay off their FTCs, adjustment speed for TAWs is considerable higher. Temporary agency workers do not have any employment contract with the client firm but with the employment agency. For this reason, the risk of layoff costs is shifted to the employment agency.

Against this background and according to previous research (Hohendanner & Gerner 2010; Holst et al. 2010; CIETT 2011) three types of 'classic' functions of temporary employment can be distinguished: ad-hoc-assignment, screening, and flexibility buffer. First, firms use temporary employment as a substitute for absent regular staff or to screen entrants. This form of usage is characterized by a low intensity of temporary jobs within the establishment (Hohendanner & Gerner 2010; Holst et al. 2010). Second, firms use temporary employment as a reaction to short-term economic discontinuity (flexibility buffer). The intensity of usage is expected to be medium-to-high in times of economic boom and low-to-zero in times of economic recession. The 'classic' types of deployment - ad-hoc-assignment, screening and flexibility buffer - are production-oriented and driven by shop floor requirements (Holst et al. 2010).

[7] However, fixed-term contracts come along with low search and hiring costs in the case of temporary layoffs and recall (Alba-Ramírez et al. 2007).

While both types of employment have similar functions, we assume that fixed-term contracts are rather used for screening and expected adjustments in the medium or long run, while TAW is rather used in the case of an immediate and unexpected adjustment need. Generally, temporary agency work is thus expected to be faster as regards downward as well as upward adjustments compared to fixed-term employment.

Independently of its original function (replacement, screening, flexibility)) before crisis, we expect that both types of employment fulfil its flexibility buffer function in times of economic recession. Assuming a different adjustment speed of both employment types, we expect a stronger variation for TAWs than for FTCs during the economic down- and upswing.

However, there is a fourth type of usage of FTCs and TAWs that is rather used independently of economic volatility: The 'strategic' deployment of temporary employment is management-driven and closely related to capital-market oriented forms of corporate governance (Arrowsmith 2008; Holst et al. 2010). Principal objective of this strategy is to raise efficiency beyond the advantage of reduced turnover costs. There are two principal ways to raise efficiency: First, both - FTCs and TAWs - are used to reduce overall wage costs. Wages for temporary workers are lower on average (Kvasnicka & Werwatz 2002; Mertens et al. 2007). Secondly, FTCs and TAWs can be used to raise the work effort of entrants (Engellandt & Riphahn 2005; Dolado & Stucchi 2008). Temporary contracts provide an incentive for entrants to exert high levels of effort in order to improve their chance to get an 'upgrade' into a regular job. Temporary employment then constitutes a fixed component of the firm's workforce independently of economic volatility (Kalleberg 2001).

From a demand side perspective we thus expect a heterogeneous adjustment of temporary employment between economic upturn (2006-2008), recession (2009) and recovery (2010) depending on the principal human resource management strategy.

According to these arguments, we expect an immediate increase of TWAs in the commencement of the economic upturn followed by a 'slower' increase of fixed-term contracts. Due to the screening function of FTCs we expect higher conversion rates from FTCs to permanent contracts leading to a stagnation of FTCs on the peak of the economic upswing (2008). During the sharp economic downturn in 2009, we expect an equivalent sharp decrease of TWAs followed by FTCs. This decline of TAWs turns into a sharp increase during the economic recovery while the recovery of FTCs is expected to be slower. The slower resurrection of FTCs during the economic recovery can be explained as follows: First, there are no differences to permanent employment in terms of search and hiring costs. Secondly, the skill-structure and bargaining position of potential FTC employees are better compared to the rather low-skilled TWA employees.

However, in our empirical analysis we cannot directly distinguish between the 'classic' flexibility function and 'strategic' motives to use temporary employment. Therefore, we identify time trends in the *incidence* as well as the *intensity* of the usage of both employment types. The aggregate reduction of temporary employment on the macro level during the crisis can be explained either by the reduction of firms using temporary employment (incidence) or by the reduction of the intensity of temporary employment

within firms. A small variation in the intensity of temporary employment independently of economic volatility would hint to the strategic use of temporary employment[8].

3. Method and Data

Within this section we look at changes in the application of flexible working arrangements, i.e. FTCs and TAWs over time. All estimations are done at the plant level. We are interested in both, the incidence and the intensity of flexible working arrangements. Therefore, we are investigating four different outcome variables, i) a dummy which is equal to one, if a plant uses at least one fixed term employee, ii) the proportion of FTC employees, given the plant has at least one FTC employee, iii) a dummy which equals one, if a plant employs at least one TAW, and finally iv) the proportion of TAWs, given the plant has at least one temporary agency worker.

In order to identify different patterns in the development of these outcomes between crisis and non-crisis plants, we assume the following simple linear relationship

$$y_{it} = \gamma C_i + T_t'\tau + (C_i T_t)'\delta + x_{it}'\beta + \varepsilon_{it}, \qquad \text{t: 2006,..., 2010} \qquad 1)$$

where y_{it} gives the outcomes observed for plant i in year t. C_i is a dummy which is equal to one, if plant i is subject to the economic crisis 2008/2009. T_t' is a vector of time dummies

[8] The demand side of temporary employment is especially relevant when unemployment is high and entrants do not have the choice between temporary and permanent positions. The proliferation of FTCs and TAWs depends on the bargaining position of the contracting parties. While employees in Germany generally prefer a permanent contract due to the better job security (Bellmann et al. 2009), employers prefer flexible contracts due to the described lower transaction costs and further efficiency advantages. Against the background of the demographic change and a potential skilled worker shortage in Germany, an improvement of the bargaining position of skilled employees in the economic recovery and an increase in permanent recruitments is likely. However, most of the TAWs are low skilled (CIETT 2011). Therefore we do not expect an impact of a potential skilled worker shortage on the development of TAWs. However, the skill structure of FTC employees is different from that of the TAW workers because FTCs are often deployed to screen entrants with an academic qualification. In this context, fixed-term contracts can be seen as a functional equivalent to vocational training contracts within the dual apprenticeship system for people with an academic qualification.

and $(C_i T_t)'$ a vector of interaction terms between the crisis dummy and the time dummies. Finally, x_{it}' is a vector of control variables (see table A3 appendix for a detailed definition) and ε_{it} a idiosyncratic error term. 1) is separately estimated for the four different outcome variables by OLS. In order to obtain fully robust standard errors, we apply a modified sandwich estimator which accounts for correlated outcomes within a given plant (Rogers 1993; Hardin & Hilbe 2007).

For our analysis we use information from the IAB Establishment Panel (Fischer et al. 2009). The basis for its sampling is the establishment file of the Federal Employment Agency in Germany, where all German establishments are recorded which have at least one employee covered by social security. The IAB Establishment Panel surveys approximately 16,000 establishments on an annual basis. The personal interviews are conducted with high-ranked managers of the firms by TNS Infratest Social Research Munich on behalf of the Institute for Employment Research (IAB). The annual questionnaire covers, for example, information about the development and the structure of the workforce (regular, fixed-term and agency workers), the business development or the sum of the earnings.

In our analysis we use data from the IAB Establishment Panel and focus on the 1st half of the years 2006 to 2010. First of all, we compare firms which are subject to the global crisis and those which are not. Whether an establishment is subject to the economic crisis, we identify by a subjective indicator provided by the IAB Establishment Panel 2010[9]. We restrict our analyses on the production sector because in Germany services were hardly affected by the crisis (Hohendanner 2010; Bellmann & Gerner 2011).

[9] Firms' representatives were directly asked whether they were subject to the global crisis or not.

Table 1 provides a descriptive analysis of FTCs and TWAs before, during and after the economic crisis for those establishments affected by the crisis.

The incidence is defined as the proportion of plants which uses at least one FTC worker or a TWA respectively. The intensity is the respective proportion given the plant has at least one FTC employee or TAW. Table 1 shows that both, the incidence and the intensity drop during the global crisis. In 2010 the incidence and intensity of TAWs recover but not to the pre-crisis level. In contrast, the figures for FTC workers continue to decline slightly in 2010.

Table 1: Development of the dependent variables for crisis plants (2008 – 2010)

	Fixed term contracts		Temporary agency workers	
	Incidence	Intensity	Incidence	Intensity
2008	0.529	0.083	0.443	0.110
2009	0.465	0.067	0.236	0.086
2010	0.463	0.063	0.332	0.100

Own calculations based on the IAB Establishment Panel Data Survey.

4. Econometric Results

We study the development of the proportion of FTCs and TAWs on the firm level, using panel data from 2006 to 2010. Descriptive statistics for key variables can be found in table A2. For a detailed definition of all variables used in our empirical investigations see table A3 in the appendix.

Basically, 1) describes a classical difference-in-differences estimator. However, despite the fact that the 2008/2009 crisis constitutes some sort of exogenous shock for the German economy and therefore, for the German plants, we do not assert to identify a 'causal' crisis effect for the adoption of flexible working arrangements, since crisis and non-crisis plants are too different (Bellmann & Gerner 2011). Instead, we are content with describing what we are observing within a multivariate framework.

Table 2: Incidence of flexible working arrangements

	Fixed term contracts			Temporary agency workers		
	Non-crisis plants (1)	Crisis plants (2)	Difference (3)=(2)-(1)	Non-crisis plants (4)	Crisis plants (5)	Difference (6)=(5)-(4)
'07 vs. '06	0.032**	0.002	-0.029	0.027**	0.050***	0.023
'08 vs. '07	-0.036**	-0.011	0.025	0.007	0.001	-0.007
'09 vs. '08	-0.012	-0.051***	-0.039**	-0.056***	-0.196***	-0.140***
'10 vs. '09	0.008	0.022*	0.014	0.059***	0.116***	0.056***

****/**/* indicates significant at the 1/5/10 % level. The results are based on the estimating equation 1). The detailed results can be found in table 1 appendix. Own calculations based on the IAB Establishment Panel Data Survey.*

Table 2 shows the estimates for the development of the incidence for adopting flexible working arrangements over time based on specification 1). Column 1 to column 3 presents the time trends for the incidence of the FTC workers for crisis and non-crisis plants as well as the corresponding differences. As can be seen except in 2008 vs. 2009 there are no significant differences in the development of the incidence of the employment of FTC workers between crisis and non-crisis plants (see column 3). The significant difference in 2008 vs. 2009 can therefore be traced back to a significant decline in the incidence for the

crisis plants within the crisis: Within the crisis the proportion of plants with FTC workers fell by around 5 percentage points in crisis plants, whereas we do not observe a significant drop for the non-crisis plants. Column 4 to column 6 show the time trends and the corresponding differences for the employment of TAWs. Especially within the crisis, the pattern of the development of the incidence for employing TAWs is very similar to the corresponding development of the incidence of employing FTC workers. The main difference is that the drop for both, crisis plants and non-crisis plants is much stronger. This corroborates to the hypothesis that the usage of TAWs induces a higher degree of flexibility. In particular, we observe a decline in the proportion of plants using temporary agency workers by around 19.4 percentage points vs. minus 5.6 percentage points for non-crisis plants. From 2009 to 2008, again, there is a significant difference in the development of the incidence between crisis and non-crisis plants. The increase in crisis plants is 6.8 percentage points higher than the corresponding one in non-crisis plants. However, while in 2010 the proportion of plants using temporary agency workers is as high as in 2008 in non-crisis plants, this is not the case for crisis plants, i.e. in 2010 the proportion of crisis plants using temporary agency workers is still around 8 percentage points lower than in 2008.

Table 3: Intensity of flexible working arrangements

	Fixed term contracts			Temporary agency workers		
	Non-crisis plants (1)	Crisis plants (2)	Difference (3)=(2)-(1)	Non-crisis plants (4)	Crisis plants (5)	Difference (6)=(5)-(4)
’07 vs. ‘06	-0.012	0.008	0.019**	0.011	0.010	-0.001
’08 vs. ‘07	0.015***	0.011***	-0.004	-0.002	0.007	0.009
’09 vs. ‘08	0.001	-0.017***	-0.017***	0.007	-0.024***	-0.031***
’10 vs. ‘09	0.007	-0.004	-0.012*	0.015*	0.015**	-0.001

****/**/* indicates significant at the 1/5/10 % level. The results are based on the estimating equation 1). The detailed results can be found in table 1 appendix. Own calculations based on the IAB Establishment Panel Data Survey.*

Table 3 reports the proportion of FTC employees as well as of TAWs, given the plant uses these types of flexible working arrangements respectively. As can be seen, within the

economic crisis we observe a qualitatively similar pattern. Again, the crisis plants exhibit a much stronger adjustment with respect to TAWs compared to fixed term contracts (-2.4 percentage points vs. -1.7 percentage points). Since non-crisis plants increase their application of TAWs from 2008 to 2009 by 0.7 percentage points whereas the application of FTC workers by 0.1 percentage points only (although the increase from 2008 to 2009 is not significant in both cases), the 'crisis effect' for the employment of TAWs becomes even a bit more obvious compared to the development of FTC workers. Interestingly, after 2009 the application of TAWs recovers remarkably within crisis plants (from 2009 to 2010 the proportion increases by 1.5 percentage points), which is apparently not the case for FTCs (the decreasing trend is even continuing, i.e. from 2009 to 2010 the proportion again decreases by 0.4 percentage points). Therefore, also the investigation of the proportion of fixed term employees and temporary agency workers yields the conclusion that the usage of the latter one induces a higher degree of flexibility.

If we contrast our identified effects in table 2 and 3 with the descriptive means of the dependent variables for the crisis plants in table 1, it becomes evident that a large amount of FTCs and TAWs is driven by strategic motivations. Despite the sharpest economic downturn since the Great Recession, most crisis plants continue to use FTCs and TAWs independently of economic volatility. The same holds for the average quotes of TAWs and FTCs in the crisis plants[10].

[10] Low variations in the intensities of temporary employment may also be driven by composition effects with respect to the subgroup under study (Angrist & Pischke 2008).

5. Conclusion

The exogenous shock of the international economic crisis gives us the opportunity to shed light on two motives behind the deployment of temporary employment in Germany: adjustment to a changing labour demand (flexibility) and strategic use independently of economic volatility. By comparing crisis and non-crisis plants within the production sector the extent of the flexibility function of temporary employment becomes apparent. First, we find empirical evidence for a pro-cyclical change of the incidence and intensity for FTC and TWA employment. Secondly, the relative changes amongst these two forms of employment are more pronounced in the case of TWAs than in the case of FTCs. Thirdly, the significant decline of the incidence of TWAs is not restricted to crisis plants but spreads over to non crisis plants whereas the decline in the incidence of FTCs is found only for crisis plants. Fourthly, for both forms of temporary employment, the intensity drops significantly for the crisis plants only. Fifthly, in accordance with our hypothesis, our results show a pronounced development of the two forms of temporary employment over the business cycle. Sixth, in relation to the mean values of the incidence and intensity of FTCs and TWAs, the effect of the crisis is moderate in the amount of 20 to 25 per cent albeit significant. This result underlines the importance of establishments' strategic use of different types of temporary employment.

On our research agenda are the further investigations concerning an alternative identification of crisis plants. Thereby, it is of interest to take into account the severity of the crisis for different establishments. Last but not least the significantly negative effect of FTCs in non-crisis plants during the years 2008/2009 points to indirect effects of the global crisis. Therefore, it seems reasonable to extent our analysis to the service sectors.

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7. Appendix

Table A1: Determinants of the incidence and intensity of FTCs and TAWs in Germany 2006-2010 (OLS regressions)

	Fixed term contracts		Temporary agency workers	
	Incidence	Intensity	Incidence	Intensity
Crisis	0.014	-0.004	0.011	-0.001
Year 07	0.032**	-0.012	0.027**	0.011
Year 08	-0.005	0.003	0.035***	0.009
Year 09	-0.017	0.004	-0.022	0.015
Year 10	-0.009	0.011	0.038***	0.031**
Interaction Crisis*Year 07	-0.029	0.020**	0.023	-0.001
Interaction Crisis*Year 08	-0.004	0.016*	0.016	0.009
Interaction Crisis*Year 09	-0.043**	-0.002	-0.124***	-0.022
Interaction Crisis*Year 10	-0.029	-0.013	-0.068***	-0.023
% women	0.045**	0.012	-0.128***	-0.071***
% part time workers	-0.021	0.002	-0.131***	-0.178***
% apprentices	0.031	-0.141***	-0.186***	-0.399***
% qualified	-0.025	-0.017**	-0.015	-0.009
Sectoral Collective bargaining	-0.008	-0.011***	0.001	-0.015
Firm level collective bargaining	-0.023	-0.003	0.048**	-0.012
Works council	0.052***	-0.032***	0.099***	-0.003
Exporting firm	0.066***	-0.010**	0.003	-0.032***
Sectoral dummies	***	***	***	***
Firm size dummies	***	***	***	***
Constant	0.038	0.222***	0.108***	0.365***
Number of observations	12,240	5,317	12,199	3,846

****/**/* indicates significant at the 1/5/10 % level. Own calculations based on the IAB Establishment Panel Data Survey.*

Table A2: Descriptive Statistics (means) for the key variables

	Fixed term contracts		Temporary agency workers	
	Incidence	Intensity	Incidence	Intensity
Dependent variable	0.434	0.075	0.315	0.108
Crisis	0.622	0.623	0.709	0.709
% women	0.260	0.260	0.241	0.203
% part time workers	0.102	0.102	0.071	0.054
% apprentices	0.046	0.046	0.046	0.045
% qualified	0.625	0.625	0.628	0.636
Sectoral Collective bargaining	0.308	0.309	0.406	0.430
Firm level collective bargain	0.083	0.083	0.115	0.137
Works council	0.357	0.358	0.613	0.667
Exporting firm	0.481	0.481	0.700	0.683
Number of observations	12,240	5,317	12,199	3,846

Own calculations based on the IAB Establishment Panel Data Survey.

Table A3: Definitions of the key variables

Variable	*Definition*
Fixed term contracts, incidence	Does the plant employ workers based on a fixed term contract? Dummy variable D=1, if yes, D=0 otherwise.
Fixed term contracts, intensity	Proportion of fixed term contract workers calculated as the number of fixed term contract workers divided by the total number of employees.
Temporary agency workers, incidence	Does the plant employ temporary agency workers? Dummy variable D=1, if yes, D=0 otherwise.
Temporary agency workers, intensity	Proportion of temporary agency workers calculated as the number of temporary agency workers divided by the total number of employees.
% women	Proportion of women calculated as the number of women divided by the total number of employees.
% part-time	Proportion of part-time workers calculated as the number of part-time workers divided by the total number of employees.
% apprentices	Proportion of apprentices calculated as the number of workers within a vocational training program divided by the total number of employees.
% qualified	Proportion of qualified workers calculated as the number of qualified workers divided by the total number of employees. Qualified workers are defined as vocational training and/or university graduates .
Sectoral collective bargaining	Is the plant subject to a sectoral collective bargaining agreement? Dummy variable D=1, if yes, D=0 otherwise.
Firm-level collective bargaining	Is the plant subject to a firm-level collective bargaining contract? Dummy variable D=1, if yes, D=0 otherwise.
Works council	Does the plant have a works council? Dummy variable D=1, if yes, D=0 otherwise.
Exporting firm	Is the plant exporting at least some of their goods in other countries? Dummy variable D=1, if yes, D=0 otherwise.