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Boris Augurzky and Harald Tauchmann

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#46



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Boris Augurzky and Harald Tauchmann*

**Less Social Health Insurance –
More Private Supplementary Insurance? –
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Abstract

This paper uses individual level data to analyze the effect of changes in the compulsory benefit package of the German statutory health insurance scheme on the demand for private supplementary insurance. In particular, we aim at measuring the effect of excluding dentures from the benefit package in 1997 as well as the effect of re-including them in 1999. A difference-in-differences estimator is used. Individuals born prior to 1979 serve as control group because only the young were affected by the reform. Our results do not exhibit any significant effects on the demand for supplementary health insurance. Thus, the hypothesis that clients do make informed choices about their health insurances' coverage is not supported.

JEL Classification: I12, P23

Keywords: Supplementary private health insurance, dentures, difference- in-differences

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* Boris Augurzky, RWI Essen and IZA Bonn; Harald Tauchmann, RWI Essen. – The authors are grateful to Jochen Kluge, Christoph M. Schmidt, Stefanie Schurer, and Marcus Tamm for many useful comments. Any errors our own. – All correspondence to Harald Tauchmann, Rheinisch-Westfälisches Institut für Wirtschaftsforschung (RWI Essen), Hohenzollernstr. 1-3, 45128 Essen, Germany, Fax: +49-201-8149-200, e-mail: harald.tauchmann@rwi-essen.de.

1 Introduction

In Germany, the statutory health insurance scheme covers all regularly employed people whose salaries do not exceed a certain income ceiling.¹ Though clients are free to choose from hundreds of different providers of statutory health insurance, the benefit package is largely standardized by law. In the political debate, this standardized package is often criticized to be rather generously defined, covering benefits that go far beyond primary health care, e.g. treatment at health resorts. Nevertheless, the insured may amend the benefit package by contracting supplementary² private insurance, yet it is not possible to reduce the benefit package³ in order to reduce insurance premiums.

Economists often argue that allowing for greater choice with respect to the benefit package covered by health insurance will increase welfare since preferences are likely to vary across individuals. Yet, the counterargument to this is that individuals typically are not able to appraise what kind of medical treatment they may need in the future and, therefore are unlikely to make informed individual choices about the benefit package. Letting medical experts define a rather broad package may therefore be in the best interest of those that are insured under the statutory health insurance scheme. Moreover, letting clients decide about their insurance coverage may result in a severe problem of adverse selection, i.e. first and foremost bad risks are likely seek for insurance.

This paper contributes to this discussion by analyzing the effects of a change in

¹Currently the income ceiling is 48 150 € per year.

²According to the definition by THOMSON & MOSSIALOS (2004) this represents “complementary” rather than “supplementary” insurance. Nevertheless, we stick to the term “supplementary” that is typically used in the context of the German health insurance system.

³With respect to a very limited set of benefits, providers of statutory health insurance are free to include them into the benefit package or not. Thus, switching the provider represents the only option for marginally changing the benefit package of the statutory insurance.

the standard benefit package on the demand for private supplementary health insurance. In particular, we look at the year 1997 when dentures – including partial ones like dental crowns and dental bridges – were excluded from the compulsory health insurance package. Yet, for political reasons, two years later these benefits were re-included again. If individuals do make informed choices about the size of their insurance coverage and individuals' preferences are in fact heterogeneous the demand for supplementary dental insurance should increase if such services are no longer covered by the compulsory health insurance scheme. The reverse should happen if such benefits are (re)included into the compulsory health insurance package.

The reform of 1997 and its abolishment in 1999 is particularly well suited for measuring the effects of changes in the compulsory benefit package. In contrast to many other reforms, the reduction in benefits did only apply to a well defined subgroup of individuals. For those born in 1978 and earlier years dentures remained in the benefit package. In contrast, individuals born after 1978 were affected by the reform. Therefore, the latter represent a treatment group while the former may serve as control group. For the identification of treatment effects we can apply a difference-in-differences approach that allows separating pure treatment effects from effects other unobservable factors may have had on the demand for supplementary private insurance.

The remainder of paper is organized as follows. Section 2 describes the legal environment and refers to the existing literature, section 3 introduces the data material, section 4 discusses the econometric approach, section 5 reports the empirical results, and section 6 concludes.

2 Regulatory Framework and Literature Review

In 1975 dentures were included into the benefit package of the German statutory health insurance. At this time the insured did not have to make any co-payments. Already two years later a co-payment of 20 % of total cost was introduced. In 1982 the co-payment was extended to 40 % and in 1989 it was further increased for those who could not verify routine dental checkups in the previous years. In 1997 for insured born later than 1978 dentures were completely excluded from the benefit package except for the case of accidental dental injuries. For insured born in 1978 and earlier years dentures remained part of the benefit package, yet the co-payments were marginally increased by five percentage-points.⁴

In 1998 the system of co-payments was changed again. Instead of covering the cost of dentures on a pro-rata basis the statutory health insurance granted certain fixed allowances to insured – born in 1978 and before – undergoing dental treatment. This allowance did not directly depend on total cost of dental treatment but on the severeness of dental health problems.⁵

In 1999, however, the reform of 1997 and 1998 was completely abolished. That is dentures, once again, became part of the benefit package, irrespective of age and the former system of pro-rata co-payments was re-introduced.⁶ Moreover, clients without coverage of dentures in 1997 and 1998 were granted the right to immediately cancel any private supplementary insurance covering such dental treatment they might have contracted in between.

⁴The relevant bill is “Gesetz zur Entlastung der Beiträge in der gesetzlichen Krankenversicherung (Beitragsentlastungsgesetz – BeitrEntlG)”, 1996 BGBl. I S. 1631.

⁵The relevant bill is “Zweites Gesetz zur Neuordnung von Selbstverwaltung und Eigenverantwortung in der gesetzlichen Krankenversicherung (2. GKV-Neuordnungsgesetz – 2. NOG)”, 1997 BGBl. I S. 1520.

⁶The relevant bill is “Gesetz zur Stärkung der Solidarität in der gesetzlichen Krankenversicherung (GKV-Solidaritätsstärkungsgesetz – GKV-SolG)”, 1998 BGBl. I S. 3853.

In the following years, dentures became subject to further reforms. In 2005 pro-rata co-payments were once again replaced by fixed allowances. In the same year a new funding scheme for covering the cost of dentures was introduced.⁷ However, insurance for dentures is still compulsory.

Our analysis focusses on the exclusion of dentures from the benefit package in 1997 for clients born later than 1978 and on the cancelation of this reform in 1999. We consider those born after 1978 as treatment group and those born in 1978 and before as control group. As pointed out the control group did not remain completely unaffected by the reforms. In 1997 and 1998 the co-payment for this group was somewhat higher than in the periods before and after. Yet, the impact of the reform on the older clients compared to those born after 1978 seems to be rather small. Our estimated treatment effect at worst might be biased towards zero for this reason.

The issue of excluding dentures from the benefit package of statutory health insurance has already been addressed by earlier work. Yet, the relevant literature dealing with the German case is purely descriptive, e.g. PKV (2001), or policy oriented, e.g. KERN (2003) and WAGNER (2003). Analyses addressing causal effects of cutbacks in benefit package on the demand for supplementary private insurance in Germany seem to be absent from the literature. For the Dutch case the exclusion of dental services from the benefit package of statutory health insurance has been analyzed by GODFRIED ET AL. (2001). This analysis identifies an enormous post-reform demand for supplementary insurance. Yet, for institutional reasons the Dutch reform of 1995 is hardly comparable to its German counterpart. Moreover, in contrast to our analysis GODFRIED ET AL. (2001) focus on the issue of adverse selection.

⁷Employers do not have to pay 50% of the health insurance premium anymore as long as dentures are concerned. The insured has to bear the entire premium.

3 The Data

We use data from the German Socioeconomic Panel (GSOEP) for analyzing the effects of changes in the compulsory benefit package on the demand for private supplementary insurance, cf. HAIKEN-DENEW & FRICK (2005).⁸ We focus on individuals covered by statutory health insurance and exclude individuals with comprehensive private insurance, which is typically the case for self-employed and civil servants. We consider the waves 1995 through 2000, i.e. two years prior to the reform in 1997, two years when the reform was in effect, and two years after the reform was abolished. We exclude those individuals that are not insured themselves, but covered by the insurance of a family member⁹, because for the years 1997 and 1998 the GSOEP does not contain information about supplementary health insurance for these individuals.

The treatment group exclusively consists of very young individuals. In order to avoid comparing completely different age groups that might exhibit quite different demand patterns for insurances we restrict the control group to individuals younger than 25 years of age.¹⁰ For the early waves, especially 1995, the treatment group is very small. For the GSOEP only individuals are interviewed when they reach the minimum age of 16. Typically interviews take place in the first third of the year. Therefore, only a limited number of individuals born in 1979 had already reached the age of 16 when the interviews in 1995 took place. Moreover, most of

⁸The data used in this paper were extracted using the Add-On package PanelWhiz v1.0 (Oxt 2006) for Stata. PanelWhiz was written by Dr. John P. Haisken-DeNew (john@panelwhiz.eu). The following authors supplied PanelWhiz SOEP Plugins used to ensure longitudinal consistency, John P. Haisken-DeNew (4), Markus Hahn and John P. Haisken-DeNew (10). The PanelWhiz generated DO file to retrieve the SOEP data used here and any Panelwhiz Plugins are available upon request. Any data or computational errors in this paper are our own. HAIKEN-DENEW & HAHN (2006) describes PanelWhiz in detail.

⁹This typically applies to children and spouses who are not employed.

¹⁰We tried several different values for the maximum age. Yet, in qualitative terms the results remained largely unchanged.

Table 1: **Supplementary Private Insurance**

Year	Treatment		Control		All	
	share	# of obs.	share	# of obs.	share	# of obs.
1995	0.000	0.3	0.023	1 347	0.023	1 347
1996	0.110	43	0.018	1 035	0.022	1 078
1997	0.014	131	0.019	1 020	0.018	1 151
1998	0.053	256	0.028	796	0.034	1 053
1999	0.059	396	0.086	685	0.076	1 080
2000	0.061	539	0.060	543	0.061	1 082
Σ	–	1 365	–	5 426	–	6 791

Notes: Individuals aged 16 to 24 years. Weighted by inverse sampling probability.

them are likely to be covered by parents’ insurance. Hence, analyzing the reform of 1997 separately from its abolishment in 1999 is not possible because of the small size of the treatment group.

In the empirical analysis the binary indicator “supplementary private insurance” serves as dependent variable. Unfortunately, prior to 1999 the data contain no information about whether dentures are covered by supplementary private insurance. So we cannot focus on the demand for supplementary dental insurance alone. For the years 1999 and 2000 about 54 % of supplementary private insurances cover dentures in the considered age group.

Table 1 displays the share of individuals holding supplementary insurance along with the number of observations by sample years for both the treatment and the control group. All values are weighted by the inverse sampling probability. In total, the sample comprises 6 791 observations (2 184 individuals) with valid information about the dependent variable. The size of the treatment group increases as the cohorts born since 1979 pass the age of 16 and leave co-insurance with their parents. The total share of individuals with supplementary private insurance is

clearly growing over time, most obviously from 1998 to 1999. This may reflect a growing awareness of personal responsibility for health insurance matters.

Yet, we cannot rule out that the pronounced increase from 1998 to 1999 represents an artefact of framing the GSOEP questionnaire. The questions concerning the health insurance status were substantially rephrased in 1999 addressing the issue of supplementary health insurance in a more straightforward way. In fact, the association of private health insurers does not report a significant increase in the number of supplementary contracts from 1998 to 1999 (PKV, 2001). Yet, reliable aggregate figures about the number of insured holding a private supplementary insurance are not available (PKV, 2001). However, since both treatment and control group are equally affected by the change in the GSOEP questionnaire we assume that in the suggested difference-in-differences approach any questionnaire-effects cancel out.

4 The Empirical Model

In order to pursue the suggested difference-in-differences approach we specify the propensity of holding supplementary private health insurance Y_{it}^* as the linear function

$$Y_{it}^* = \delta_0 D_i + \delta_1 (Q_t^{97} \times D_i) + \delta_2 (Q_t^{99} \times D_i) + \theta' Z_t + \beta' X_{it} + \varepsilon_{it}. \quad (1)$$

The subscripts i and t indicate individuals and periods, respectively. D_i represents a dummy-variable indicating that an individual belongs to the treatment group. The indicator Q_t^{97} takes the value one for all periods $t \geq 1997$ and zero otherwise. Q_t^{99} takes the value one if $t \geq 1999$ holds and zero otherwise. Z_t represents a vector of yearly dummies indicating the current period, while X_{it} represents a vector of control variables. Finally ε_{it} is a random error term. The vectors of coefficients δ , θ , and

β are subject to estimation. Our focus is on δ_1 and δ_2 . The former captures the effects of excluding dentures from the benefit package on the demand for supplementary health insurance, while the latter captures the effect of re-including them.¹¹ In order to identify the effects δ_1 and δ_2 we have to assume that any unobserved time varying determinants of the demand for supplementary insurance other than the analyzed change in the legal environment are captured by the time fixed-effects θ . That is, we rule out that any of these determinants exhibits heterogeneous effects on the control and the treatment group; cf. AUGURZKY ET AL. (2006) for a similar approach.

When estimating the model, we impose the restriction $\delta_2 = -\delta_1$ on the treatment effects. That is, we assume that abolishing the reform of 1997 exactly cancels out the effect the reform might have had on the demand for supplementary private health insurance. This is done for technical reasons. Prior to the year 1997, we observe just a single individual holding a supplementary health insurance who belongs to the treatment group.¹² Thus in standard binary choice models, the identification of δ_1 would rest on this single observation alone if no restrictions were imposed on the coefficients.

Besides the constant term, the vector of control variables X_{it} includes, age, net-personal equivalent income, current health status (good, satisfactory, poor), and school-leaving degree (secondary or lower, intermediate, technical/upper secondary). The current labor market status is captured by two indicators: one for being currently in education and one for being employed except for apprenticeship. In addition, indicators for being female, having German citizenship, being unmarried,

¹¹In parametric binary choice models (Logit, Probit, etc.) one has to scale the estimated coefficient by the value of the probability density function $f(\cdot)$ at some point of reference, in order to obtain marginal effects on the probability $\Pr(Y_{it} = 1)$.

¹²The sampling weight for this particular individual is rather high. Thus Table 1 seemingly indicates a much larger number of observations.

having completed vocational education, and living in east Germany are included.

The basic model is estimated using a standard Logit model pooling all observations from the panel waves 1995 to 2000. As a robustness check, we also try the Probit, the Complementary Log-Log, and the Linear Probability (LP) model. The coefficients of primary interest, i.e. δ_1 and δ_2 , do not represent parameters in terms of a structural parametric model. They rather have to be interpreted in terms of average treatment effects. Hence, we take the sampling weights into account and report results from weighted regressions; cf. CAMERON & TRIVEDI (2005).

In addition to the basic specification, we estimate model variants that pair-wise compare one individual year when the reform was in effect – i.e. either the year 1997 or the year 1998 – and the post-abolishment year 2000. Here, equation (1) reduces to

$$Y_{it}^* = \delta_0 D_i + \delta_2 (Q_t^{99} \times D_i) + \theta' \tilde{Z}_t + \beta' X_{it} + \varepsilon_{it}. \quad (2)$$

In equation (2) \tilde{Z}_t consists of a single period-indicator. For pair-wise comparing years we have to focus on the re-including of dentures in 1999. Due to the small treatment group for the pre-1997 waves the cutback in benefits in 1997 cannot separately be analyzed. We also estimate equation (2) by Logit, Probit, the Complementary Log-Log, and LP.

Finally, we apply linear and Logit fixed-effects (FE) estimators in order to account for unobserved individual heterogeneity. For the fixed-effect estimators, equation (1) has to be augmented by α_i , i.e. time-invariant individual intercepts.

$$Y_{it}^* = \alpha_i + \delta_1 (Q_t^{97} \times D_i) + \delta_2 (Q_t^{99} \times D_i) + \theta' Z_t + \beta' \tilde{X}_{it} + \varepsilon_{it}. \quad (3)$$

In FE models only time varying characteristics may enter \tilde{X}_{it} . Analogously, a linear age effect is not identified if yearly dummies are included, i.e. the variable age

can not enter \widetilde{X}_{it} either. The reason for this is that the absolute age level – that separates age effects from time effects – is already absorbed by the individual effects. Moreover, the conditional fixed-effects Logit estimator (CHAMBERLAIN, 1980), which is used in this analysis, only uses the information of those individuals that have changed their status concerning the dependent variable. The restriction $\delta_2 = -\delta_1$ is imposed on the FE specifications too, though for these models the identification of δ_1 is somewhat stronger than in the pooled models.

5 Results

Table 2 displays the estimated marginal effects for two variants of the pooled Logit model. The first variant includes the full set of explanatory variables. The second one excludes socioeconomic variables that are clearly insignificant.¹³ These are German citizenship, being currently in education, having completed vocational education, being unmarried and current health. With respect to the significant control variables, estimation results indicate that females are more likely to hold a supplementary insurance than males. Being employed and being in education have positive effects too. Jointly, the level of educational attainment has a significant effect. Finally, the probability of holding a private supplementary insurance increases with personal income.

Yet, most importantly, the treatment effect turns out to be insignificant for both model variants, even at the 10%-level. This also holds for the model that only compares two years and the fixed-effects models as well; see Tables 3 and 4. Moreover, the Probit as well as the Complementary Log-Log specification mirror the results for the Logit model. For the Linear Probability model, results are less akin. Yet,

¹³A stepwise regression technique using backward selection and the 0.1-significance level for removal is used to determine the preferred small model.

Table 2: Marginal Effects for Pooled Logit Regressions

parameter/variable	Full Model		Small Model	
	Estimate	Std. Error	Estimate	Std. Error
$\delta_2 f(\cdot) = -\delta_1 f(\cdot)$	0.007	0.010	0.008	0.011
$\delta_0 f(\cdot)$	-0.013	0.007	-0.013	0.008
year 1996	-0.001	0.010	-0.003	0.010
year 1997	-0.005	0.009	-0.007	0.009
year 1998	0.012	0.012	0.008	0.012
year 1999	0.064*	0.028	0.060*	0.028
year 2000	0.051*	0.020	0.048*	0.019
age	-0.004	0.002	-0.004*	0.002
female	0.018*	0.006	0.018*	0.006
east	-0.007	0.004	–	–
German citizenship	0.016	0.010	–	–
employed	0.024*	0.008	0.023*	0.008
in education	0.018*	0.008	0.023*	0.009
completed vocational education	-0.013	0.008	–	–
never married	-0.006	0.017	–	–
income	0.001*	0.000	0.001*	0.000
satisfactory health	0.011	0.007	–	–
poor health	0.001	0.010	–	–
intermediate school	-0.010	0.005	-0.011	0.006
upper secondary/technical school	0.004	0.007	0.008	0.008
number of observations	6 337		6 337	
log-likelihood	-924.2		-936.0	
joint significance (P-value)	0.000		0.000	

Notes: Robust standard errors reported. * indicate significance at the 0.05-level. Marginal effects calculated at the means of independent variables. Observations weighted by inverse sampling probability.

even in this case we do not obtain a significant and negative estimate for δ_2 .

In essence, our results do not indicate any strong and significant effect of the exclusion and re-inclusion of dentures from the statutory benefit package on the demand for supplementary private health insurance. Thus, we cannot rule out that clients are in fact not capable of making informed choices about the coverage of their health insurance and, therefore, are well off with a comprehensive compulsory benefit package. However, interpreting the results in such a distinct way seems not to be justified for the following reasons.

Table 3: Marginal Effects for Two-Years Pooled Logit Regressions

parameter/variable	2000 vs. 1998		2000 vs. 1997	
	Estimate	Std. Error	Estimate	Std. Error
$\delta_2 f(\cdot)$	0.010	0.021	-0.001	0.018
$\delta_0 f(\cdot)$	0.003	0.021	0.013	0.022
year 2000	0.018	0.011	0.028*	0.012
age	0.005	0.004	0.004	0.003
female	0.024*	0.008	0.014	0.007
east	-0.013*	0.006	-0.004	0.006
German citizenship	0.032*	0.006	0.024*	0.007
completed vocational education	-0.020*	0.009	-0.011	0.008
income	0.002*	0.001	0.001*	0.000
in education	-0.002	0.008	0.001	0.008
intermediate school	-0.003	0.009	0.007	0.009
upper secondary/technical school	0.011	0.012	0.026	0.015
number of observations	2 517		2 523	
log-likelihood	-412.5		-377.9	
joint significance (P-value)	0.000		0.000	

Notes: Robust standard errors reported. * indicate significance at the 0.05-level. Marginal effects calculated at the means of independent variables. Observations weighted by inverse sampling probability.

First, in our sample the treatment group is rather small. Hence, estimation of treatment effects rests on only a few observations leading to imprecise estimation results and large standard errors. Moreover, other limitations of data discussed in section 3 are likely to add additional noise to the data making the detection of treatment effects even more awkward. Second, to a minor degree even the control group has been affected by the analyzed change in law. This might result in estimates of the treatment effects that are biased towards zero. Third, the analyzed reform has been in force for only two years. Yet, it is well known from other studies concerned with the German health insurance market that clients do adjust rather slowly to exogenous shocks, cf. TAMM ET AL. (2007). That is, many individuals belonging to the treatment group might have considered or even planned buying supplementary health insurance because of the reform of 1997. Yet, the reforms might have been abolished so quickly that these plans were never implemented. Moreover,

Table 4: Coefficients for Fixed-Effects Regressions

parameter/variable	Chamberlain's FE-Logit		Linear Probability	
	Coeff.	Std. Error	Coeff.	Std. Error
$\delta_2 = -\delta_1$	0.494	0.933	0.000	0.012
year 1996	0.245	0.618	-0.003	0.007
year 1997	0.150	0.644	-0.005	0.007
year 1998	0.085	0.683	-0.009	0.008
year 1999	2.420*	0.708	0.042*	0.009
year 2000	2.372*	0.794	0.036*	0.011
east	0.382	0.578	0.010	0.008
employed	0.277	0.584	0.004	0.009
completed vocational education	0.721	0.644	0.021*	0.010
income	-0.042	0.042	-0.002*	0.001
intermediate school	-1.471	0.762	-0.035*	0.015
upper secondary/technical school	-3.798*	1.009	-0.092*	0.021
number of observations		343		6749
log-likelihood		-81.3		-
joint significance (P-value)		0.000		0.000

Notes: Robust standard errors reported. * indicate significance at the 0.05-level.

the change from a 40 % co-payment to full self-pay treatment might not have been strong enough to trigger effects that are easily identified in the data; cf. BAUER ET AL. (2007) for a similar case. Forth, our focus is exclusively on very young individuals. Yet, people from this age group are probably less likely covered by supplementary health insurance and may not be representative for the entire population. That is, we cannot rule out that reforms similar to the one analyzed here might exhibit more substantial effects for other age groups. Finally, in the late 1990s freedom of choice and personal responsibility were rather novel concepts to the German statutory health insurance scheme. Actually, free choice of the insurance provider has been introduced just in 1996. Thus, at this time many clients might in fact have not been in a position to rationally decide about the coverage their health insurance. Yet, after ten years of free choice, things might have changed and nowadays one might expect much stronger effects of changes in the benefit package than those we observe in data from the late 1990s.

6 Conclusions

In this paper we have analyzed the exclusion of dentures from – and the subsequent re-inclusion to – the compulsory benefit package of the German statutory health insurance scheme. Our focus is on the effects on the demand for supplementary private health insurance. The empirical analysis, which uses a difference-in-differences approach and is based on individual level data from the GSOEP, does not show any significant effects. This holds for a wide range of different model specifications. Thus, our results do not support the hypothesis that clients do make informed choices about their health insurances' coverage and, therefore, would be better off if more freedom of choice were introduced to the German statutory health insurance scheme.

Yet, our results does not clearly reject this hypothesis either. That is, the analyzed reform might have had effects on the demand for supplementary private insurance but we did not detect them because of insufficient data. The rather small treatment group – apparently, the reform has intentionally been designed not to affect many clients immediately – that exclusively consists of very young individuals as well as the immediate abolishment of the analyzed benefit cut gives some support to this interpretation. Hence, more research in the effects of benefit cutbacks is required in order to answer the question of whether introducing more freedom of choice to of the statutory health insurance scheme will be beneficial.

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