Bye Bye, G.I. - The Impact of the U.S. Military Drawdown on Local German Labor Markets

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Tagung des SFB 649 "Ökonomisches Risiko"
Motzen, 1 July 2011
Bases of U.S. Forces in Germany

US Forces Base Personnel
- <1000
- 1000-2500
- 2500-5000
- >5000
Bases of U.S. Forces in Germany

1990

2002

US Forces Base Personnel
- <1000
- 1000-2500
- 2500-5000
- >5000
U.S. Forces in Germany - Historical Evolution

U.S. Military Active Duty Personnel in Germany, 1950-2005

in Thousands

Year


0 50 100 150 200 250 300

Army
Air Force
Navy/Marine Corps

Motivation & Research question
Motivation - Economic impact of military base closures

- Base closures constitute a large, exogeneous shock at local level
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- Strong public interest (e.g. subsidies for regional development)
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- But: challenges for empirical research
  - Identification of causality (endogeneity bias)
  - Data availability
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- The drawdown of U.S. Military Forces in Germany provides a unique "natural experiment"-type setting:
  - Exogeneous as drawdown decisions follow U.S. military rationale
  - Strong regional variation in withdrawal 'treatment' intensity and timing
  - Separation of direct vs. indirect (spill-over) effects

Research Question

What is the impact of the U.S. drawdown on the regional labor market?

- Spill-over effects into private sector employment
- Spill-over effects into private sector wages
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Outline

- Motivation & Research Question
- Related Literature
- Historical Background - U.S. Forces Stationing and Withdrawal in Germany
- Empirical strategy
- Data sources
- Results
- Robustness Checks
- Conclusion & Future Work
Related Literature

1. **Adjustment to regional shocks**

2. **Impact of Military Base Realignment and Closures (BRAC)**
   Some early descriptive/case studies for U.S. withdrawal in Germany:

3. **Other specific/exogeneous regional economic shocks**
   Regional impact of coal boom and bust:

   Spillover effects from million dollar plants:
   Greenstone/Moretti (2003), Greenstone/Horbek/Moretti (2010)
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       Paloyo et al. 2010a, 2010b

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U.S. Forces in Germany - Stationing and Drawdown Process

- Initial stationing locations after World War II
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- Selection criteria for U.S. base closures
  1. Ensuring that the forces would meet military and operational requirements
  2. Decreasing support costs and increasing efficiency of base operations
  3. Minimizing personnel moves
  4. Reducing environmental impact
  5. Considering the proximity of training areas, the quality of housing and facilities, the local political and military environment, the concerns of host nations, and the base’s proximity to road and rail networks.

U.S. Forces in Germany - Structure of demand in the German economy

1. Bases as direct employers of German civilian workers (≈71,000 in 1990)
U.S. Forces in Germany - Structure of demand in the German economy

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2. Demand by U.S. bases for goods and services from German companies (≈4.2 bn DM in 1986)
   - Construction, repair, maintenance
   - Real estate (rented homes & apartments)
   - Food, gasoline, mail and railway, services etc.
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   - Construction, repair, maintenance
   - Real estate (rented homes & apartments)
   - Food, gasoline, mail and railway, services etc.

   - Hotels, restaurants, bars, entertainment
   - Rental cars, car dealerships, gas stations
   - Groceries, daily necessities
Data sources

1. Data on U.S. Army Stationing and Withdrawal in Germany
   - Number of U.S. personnel (Soldiers, U.S. Civilian, German employees)
   - All US Army and Airforce Bases in West-Germany
   - Exact geographic base location (geocoded)
   - Information on date(s) of announcement of base reduction/closure, actual final closure (exact to the day)
   - Some add. information on type of base, area size, estd. replacement value etc.
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2. IAB employment and wage data from *IAB Beschäftigungshistorie (BeH)* and *IAB Betriebshistorikpanel (BHP)*
   - 100% sample of individual employment spells for 4 Bundesländer (Hessen, Rheinland-Pfalz, Bayern, Baden-Württemberg, Bayern)
   - BeH individual variables: info on start/end of employment spells, age, nationality, education, full-time/part-time, occupation, gross daily wage
   - BHP employer variables: location (district), industry, firm size
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3. Regional statistical data from Federal and Regional Statistical Offices
   - Area, Total population/population density, employment, unemployment rate, net migration, classification of area types (BBR)
Empirical strategy

Empirical approach (1) - Employment

1. Panel Diff-in-Diff

\[ \log Y_{kt} = \alpha_k + \delta_t + \beta \times TI_k \times 1 \left[ t > Year_{0k} \right] + \epsilon_{kt} \]  

- \( \alpha_k \) - District fixed effects
- \( \delta_t \) - Year fixed effects
- \( TI_k \) - Measure of treatment intensity
- \( Year_{0k} \) - Year of 1st announcement of withdrawal in district
Empirical approach (1) - Employment

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⇒ Inclusion of State-by-Year-Effects

\[ \log Y_{kt} = \alpha_k + \delta_t + \eta_{st} + \beta \times TI_k \times 1 \left[ t > \text{Year}_{0k} \right] \]  \hspace{1cm} (2)

- \( \eta_{st} \): State-by-Year specific effects
Empirical approach (1) - Employment

1. Panel Diff-in-Diff

\[ \log Y_{kt} = \alpha_k + \delta_t + \beta \times TI_k \times 1 [t > Year_{0k}] + \epsilon_{kt} \]  

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\[ \log Y_{kt} = \alpha_k + \delta_t + \eta_{st} + \beta \times TI_k \times 1 [t > Year_{0k}] + \epsilon_{kt} \]  

⇒ Inclusion of linear/quadratic district specific time trends

\[ \log Y_{kt} = \alpha_{0k} + \alpha_{1kt} + \alpha_{2kt} + \delta_t + \eta_{st} + \beta \times TI_k \times 1 [t > Year_{0k}] + \epsilon_{kt} \]  

- \( \alpha_{0k} \) - District specific intercept
- \( \alpha_{1k} \) - District specific coefficient on linear time trend
- \( \alpha_{2kt} \) - District specific coefficient on quadratic time trend
Empirical approach (2) - Employment

Dynamic specification

- Exploiting regional variation in timing of 1st announcement date to explore pattern of lead/anticipatory and lagged effects:

\[
\log Y_{kt} = \alpha_0 + \alpha_{1kt} + \alpha_{2kt} + \delta_t + \eta_{st} + \sum_{s=-5}^{+6} (\tau_s \times TI_k \times 1 [t = Year_{0k} + s]) + \epsilon_{kt}
\]

\(\tau_s\) - Period treatment effects
Empirical strategy

Empirical approach (3) - Wages

1. Micro estimation at individual level

\[ \log W_{ikt} = \alpha_0 + \alpha_{1kt} + \alpha_{2kt} + \delta_t + \eta_{st} + \beta \times T I_k \times 1[t > Year_{0k}] + X_{ikt} \gamma + \epsilon_{ikt} \] (5)

- Individual level covariates
  (age, age^2, nationality, education, firm size, occupation)
Empirical strategy

Empirical approach (3) - Wages

1. Micro estimation at individual level

\[ \log W_{ikt} = \alpha_{0k} + \alpha_{1kt} + \alpha_{2kt} + \delta_t + \eta_{st} + \beta \times Tl_k \times 1[t > Year_{0k}] + X_{ikt} \gamma + \epsilon_{ikt} \]  \hspace{1cm} (5)

\[ X_{ikt} \] - Individual level covariates

(age, age\(^2\), nationality, education, firm size, occupation)

2. 2-step estimation at District x Industry level

Step 1.

\[ \log W_{ijkt} = \eta_{jkt} + X_{ijkt} \gamma + \mu_{ijkt} \]  \hspace{1cm} (6)

\[ j \] - Industry index (i=1,…,8)

\[ \eta_{jkt} \] - District x Industry effects (conditional on individual level covariates)
Empirical approach (3) - Wages

1. Micro estimation at individual level

\[ \log W_{ikt} = \alpha_{0k} + \alpha_{1kt} + \alpha_{2kt} + \delta_t + \eta_{st} + \beta \times T I_k \times 1 \left[ t > \text{Year}_{0k} \right] + X_{ikt} \gamma + \epsilon_{ikt} \]  

(5)

\[ X_{ikt} - \text{Individual level covariates} \]
\[ \text{(age, age}^2\text{, nationality, education, firm size, occupation)} \]

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Step 1.

\[ \log W_{ijkt} = \eta_{jkt} + X_{ijkt} \gamma + \mu_{ijkt} \]  

(6)

\[ j - \text{Industry index (i=1,\ldots,8)} \]
\[ \eta_{jkt} - \text{District X Industry effects (conditional on individual level covariates)} \]

Step 2.

\[ \hat{\eta}_{jkt} = \alpha_{0k} + \alpha_{1kt} + \alpha_{2kt} + \delta_t + \eta_{st} + \beta_j \times T I_k \times 1 \left[ t > \text{Year}_{0k} \right] + \xi_{jkt} \]  

(7)
Treatment vs. control districts & treatment intensity

Distribution of U.S. withdrawal 'treatment intensity' across treatment districts
N=70
Empirical strategy

Sample specification

- **Employment**
  - Full-time, private sector employment
  - Age 25-55
  - Education variable improved via imputation procedures proposed by Fitzenberger et al. (1999, 2006)
  - Crosssamples for reporting date 30/06 in each year, collapsed on district level
  - Employment spell is recorded at employer’s location

- **Wages**
  - 10 percent subsample for males age 25-55
  - Gross real daily wages, deflated by common price index for West Germany
  - Imputation of right-censored wages separately by education groups (Gartner, 2005) with full set of available covariates
## Descriptive Statistics

<table>
<thead>
<tr>
<th>Demographics</th>
<th>1990</th>
<th>2002</th>
<th>Diff.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>195,130</td>
<td>125,259</td>
<td>69,871***</td>
</tr>
<tr>
<td></td>
<td>(21,082)</td>
<td>(7,377)</td>
<td>(22,336)</td>
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<tr>
<td>Population density</td>
<td>703</td>
<td>347</td>
<td>356***</td>
</tr>
<tr>
<td>(inhabitants per sqkm)</td>
<td>(97)</td>
<td>(54)</td>
<td>(111)</td>
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<thead>
<tr>
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<tr>
<td>GDP per capita†</td>
<td>24,451</td>
<td>22,002</td>
<td>2,449</td>
</tr>
<tr>
<td>(EUR)</td>
<td>(1,165)</td>
<td>(1,057)</td>
<td>(1,573)</td>
</tr>
<tr>
<td>Unemployment Rate</td>
<td>5.3</td>
<td>4.8</td>
<td>0.5</td>
</tr>
<tr>
<td></td>
<td>(0.2)</td>
<td>(0.2)</td>
<td>(0.3)</td>
</tr>
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<table>
<thead>
<tr>
<th>Area type</th>
<th>1990</th>
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<th>Diff.</th>
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<tr>
<td>Urban</td>
<td>.429</td>
<td>.250</td>
<td>.179**</td>
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<tr>
<td></td>
<td>(.059)</td>
<td>(.056)</td>
<td>(.082)</td>
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<td>.583</td>
<td>-.140</td>
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<td></td>
<td>(.060)</td>
<td>(.064)</td>
<td>(.087)</td>
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<tr>
<td>Rural</td>
<td>.129</td>
<td>.167</td>
<td>-.038</td>
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<td></td>
<td>(.040)</td>
<td>(.048)</td>
<td>(.063)</td>
</tr>
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<table>
<thead>
<tr>
<th>Geographic distribution</th>
<th>1990</th>
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<th>Diff.</th>
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</thead>
<tbody>
<tr>
<td>Hesse</td>
<td>.229</td>
<td>.067</td>
<td>.162***</td>
</tr>
<tr>
<td></td>
<td>(.050)</td>
<td>(.032)</td>
<td>(.060)</td>
</tr>
<tr>
<td>Rhineland-Palatinate</td>
<td>.171</td>
<td>.183</td>
<td>-.012</td>
</tr>
<tr>
<td></td>
<td>(.045)</td>
<td>(.050)</td>
<td>(.068)</td>
</tr>
<tr>
<td>Baden-Wuerttemberg</td>
<td>.214</td>
<td>.233</td>
<td>-.019</td>
</tr>
<tr>
<td></td>
<td>(.049)</td>
<td>(.055)</td>
<td>(.074)</td>
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<tr>
<td>Bavaria</td>
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<td>.517</td>
<td>-.131</td>
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<td>(.058)</td>
<td>(.065)</td>
<td>(.087)</td>
</tr>
<tr>
<td>N</td>
<td>70</td>
<td>60</td>
<td>70</td>
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</tbody>
</table>

Notes: †Due to data limitations, GDP per capita reported in 1990 column are 1992 values. * Significant at 10%, ** at 5%, *** at 1%.
**Impact of withdrawal on employment (baseline)**

**Table 4:** Estimated impact of U.S. military withdrawal on total district employment, 1975-2002

<table>
<thead>
<tr>
<th>Dep. variable: Total employment (log)</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. - All</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>U.S. WD treatment (%)</td>
<td>-.015**</td>
<td>-.018***</td>
<td>-.009***</td>
<td>-.007***</td>
</tr>
<tr>
<td></td>
<td>(.006)</td>
<td>(.006)</td>
<td>(.003)</td>
<td>(.002)</td>
</tr>
<tr>
<td>R</td>
<td>.987</td>
<td>.989</td>
<td>.998</td>
<td>.998</td>
</tr>
<tr>
<td>B. - Male</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>U.S. WD treatment (%)</td>
<td>-.015**</td>
<td>-.017***</td>
<td>-.008***</td>
<td>-.005**</td>
</tr>
<tr>
<td></td>
<td>(.006)</td>
<td>(.006)</td>
<td>(.003)</td>
<td>(.002)</td>
</tr>
<tr>
<td>R</td>
<td>.987</td>
<td>.989</td>
<td>.997</td>
<td>.998</td>
</tr>
<tr>
<td>C. - Female</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>U.S. WD treatment (%)</td>
<td>-.016**</td>
<td>-.021***</td>
<td>-.011***</td>
<td>-.010***</td>
</tr>
<tr>
<td></td>
<td>(.008)</td>
<td>(.008)</td>
<td>(.003)</td>
<td>(.002)</td>
</tr>
<tr>
<td>R</td>
<td>.985</td>
<td>.986</td>
<td>.997</td>
<td>.998</td>
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</tbody>
</table>

*Other covariates:*
- State by year dummies: No, Yes, Yes, Yes
- District x time trends: No, No, Yes, Yes
- District x time trends: No, No, No, Yes

N: 3,640

**Notes:** Each cell reports the coefficient on the treatment variable for one regression. All regressions include district and year fixed effects. Robust std. errors clustered at district level in parentheses.
* Significant at 10%, ** at 5%, *** at 1%.
## Dynamic pattern of withdrawal effect on employment

**Table 8:** Dynamic pattern of impact of U.S. military withdrawal on total employment at district level

<table>
<thead>
<tr>
<th>Dep. variable:</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
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<td>WD announcement</td>
<td>-.002</td>
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<td>-.002</td>
<td>-.001</td>
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<td>(WD)</td>
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<td>-.004</td>
<td>-.003**</td>
<td>-.003*</td>
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<tr>
<td>(WD)</td>
<td>(.003)</td>
<td>(.003)</td>
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<td>(.001)</td>
</tr>
<tr>
<td>WD announcement</td>
<td>-.005</td>
<td>-.005*</td>
<td>-.005**</td>
<td>-.004**</td>
</tr>
<tr>
<td>(WD)</td>
<td>(.003)</td>
<td>(.003)</td>
<td>(.002)</td>
<td>(.002)</td>
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<tr>
<td>WD announcement</td>
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<td>(WD)</td>
<td>(.003)</td>
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<tr>
<td>WD announcement</td>
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<td>-.006*</td>
<td>-.005*</td>
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<td>(WD)</td>
<td>(.004)</td>
<td>(.004)</td>
<td>(.003)</td>
<td>(.003)</td>
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<tr>
<td>WD announcement</td>
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<td>-.010**</td>
<td>-.009**</td>
<td>-.008**</td>
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<tr>
<td>(WD)</td>
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<td>(.005)</td>
<td>(.004)</td>
<td>(.004)</td>
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<tr>
<td>WD announcement</td>
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<td>-.012**</td>
<td>-.012***</td>
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<td>(WD)</td>
<td>(.005)</td>
<td>(.005)</td>
<td>(.004)</td>
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<tr>
<td>WD announcement</td>
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<td>-.015***</td>
<td>-.014***</td>
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<td>(WD)</td>
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**Other covariates:**
- State by year dummies: No, Yes, Yes, Yes
- District x time trends: No, No, Yes, Yes
- District x time trends: No, No, No, Yes

- $R^2$: .987, .989, .998, .998
- $N$: 3,640, 3,640, 3,640, 3,640

Notes: All regressions include district and year fixed effects. Robust standard errors clustered at district level in parentheses.

The WD announcement dummies are defined relative to the year of the first announcement of the U.S. withdrawal for a district, $/\text{WD} = 0$.

* Significant at 10%, ** at 5%, *** at 1%.
## Effect on industry wages

<table>
<thead>
<tr>
<th>Industry</th>
<th>Dep. Variable: Real wages (log)</th>
<th>(1)</th>
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<th>(3)</th>
<th>(4)</th>
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<td>Basic materials</td>
<td>U.S. WD treatment (%)</td>
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<td>.004</td>
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<td>(.004)</td>
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<td>Investment goods</td>
<td>U.S. WD treatment (%)</td>
<td>.002</td>
<td>.003</td>
<td>.001</td>
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<td>(.003)</td>
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<td>Food and consumption goods</td>
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<td>Transport/Information</td>
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<td>.010***</td>
<td>-.001</td>
<td>-.005***</td>
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<td>(.007)</td>
<td>(.003)</td>
<td>(.002)</td>
<td>(.002)</td>
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<tr>
<td>Corporate services</td>
<td>U.S. WD treatment (%)</td>
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<td>.003</td>
<td>-.004**</td>
<td>-.005**</td>
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<td>(.009)</td>
<td>(.005)</td>
<td>(.002)</td>
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<tr>
<td>Private household services</td>
<td>U.S. WD treatment (%)</td>
<td>.006</td>
<td>.004</td>
<td>.002</td>
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<td>Individual level covariates</td>
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<td>Yes</td>
<td>Yes</td>
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</tbody>
</table>

Notes: Each cell reports the coefficient on the treatment variable for one regression. All regressions include district and year fixed effects. Robust std. errors clustered at district level in parentheses. * Significant at 10%, ** at 5%, *** at 1%.
### Effect on industry wages by firm size (1)

<table>
<thead>
<tr>
<th>Dep. Variable: Real wages (log)</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
</tr>
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<tbody>
<tr>
<td>by industry</td>
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</tr>
<tr>
<td>1 Basic materials</td>
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<tr>
<td>U.S. WD treatment (%)</td>
<td>.012***</td>
<td>.011***</td>
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<td>.004*</td>
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<tr>
<td>(U.S. WD treatment (%) X small)</td>
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<td>(.004)</td>
<td>(.003)</td>
<td>(.002)</td>
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<td>(U.S. WD treatment (%) X small)</td>
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<td>(.005)</td>
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</tr>
<tr>
<td>2 Investment goods</td>
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<tr>
<td>U.S. WD treatment (%)</td>
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<td>.007**</td>
<td>.004***</td>
<td>.004***</td>
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<td>-.031***</td>
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<td>(.005)</td>
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<td>(.004)</td>
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<tr>
<td>3 Food and consumption goods</td>
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<td>U.S. WD treatment (%)</td>
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<td>.006**</td>
<td>.004**</td>
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<td>4 Construction</td>
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<tr>
<td>U.S. WD treatment (%)</td>
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## Effect on industry wages by firm size (2)

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<th>Industry</th>
<th>Dep. Variable: Real wages (log) (1) (2) (3) (4)</th>
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<td>.013*** (.003)</td>
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<td>U.S. WD treatment (%) X small</td>
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<td></td>
<td>-.019*** (.005)</td>
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<tr>
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<td>-.019*** (.005)</td>
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<tr>
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<td>-.019*** (.005)</td>
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<tr>
<td>U.S. WD treatment (%) X medium</td>
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<tr>
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<td>-.009*** (.003)</td>
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<td>-.009*** (.003)</td>
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<tr>
<td></td>
<td>-.010*** (.003)</td>
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<tr>
<td>6 Transport/Information</td>
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<td>U.S. WD treatment (%)</td>
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<td>.026*** (.007)</td>
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<td>.012*** (.004)</td>
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<td>.009*** (.004)</td>
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<td>-.019*** (.004)</td>
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<td>8 Private household services</td>
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<td>.035*** (.006)</td>
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<td>-.028*** (.007)</td>
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<td>-.028*** (.007)</td>
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</table>

Continued on next page
Robustness checks

- Selection of treatment and control districts
- Local shocks coinciding with U.S. drawdown process
  - *Bundeswehr* reductions
  - In-migration from Eastern Germany after the fall of the Berlin wall
  - Regional subsidy programmes
- Serial correlation - Alternative Std. Errors
- Heteroscedasticity - Weighting by regional Kreis size
- Level of aggregation/spatial nature
- Influence of FX effect
- Heterogeneity of effect between U.S. Air Force vs. U.S. Army bases
### Robustness checks

<table>
<thead>
<tr>
<th>Dep. Variable: Total employment (log) - All</th>
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<td>1. Baseline Table 4-A. estimates</td>
<td>-0.009***</td>
<td>-0.007***</td>
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<tr>
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<td>(0.003)</td>
<td>(0.002)</td>
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<tr>
<td>2. Exclude treatment districts with pop. &gt; most populous control district</td>
<td>-0.009***</td>
<td>-0.007***</td>
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<tr>
<td>N=3,472, N(treatment)=64, N(control)=60</td>
<td>(0.003)</td>
<td>(0.002)</td>
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<tr>
<td>3. Exclude districts in urban areas</td>
<td>-0.012***</td>
<td>-0.009***</td>
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<td>N=2,380, N(treatment)=40, N(control)=45</td>
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<td>(0.003)</td>
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<tr>
<td>4. Include only treatment districts with U.S. force presence</td>
<td>-0.008***</td>
<td>-0.005***</td>
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<tr>
<td>N=1,960, N(treatment)=70, N(control)=0</td>
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<td>(0.002)</td>
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<tr>
<td>5. Keep only treatment districts with complete closure by 1995</td>
<td>-0.006**</td>
<td>-0.004**</td>
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<td>N=2,800, N(treatment)=40, N(control)=60</td>
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<td>(0.002)</td>
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<td>6. Include border districts</td>
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<td>-0.004*</td>
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<td>N=5,180, N(treatment)=89, N(control)=96</td>
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<td>(0.002)</td>
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<td>7. Exclude districts with Bundeswehr reduction 1991-2001</td>
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<td>-0.008*</td>
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<td>N=1,372, N(treatment)=49, N(control)=20</td>
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<td>(0.004)</td>
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<td>8. Weight by district population in 1990</td>
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<td>-0.006***</td>
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<td>(0.002)</td>
<td>(0.001)</td>
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<tr>
<td>9. Cameron-Gelbach-Miller two-way clustering</td>
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<td>-0.005***</td>
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<td></td>
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<td>(0.002)</td>
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<tr>
<td>10. Cluster by labor market region †</td>
<td>-0.009***</td>
<td>-0.007***</td>
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<tr>
<td></td>
<td>(0.003)</td>
<td>(0.002)</td>
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<tr>
<td>11. Aggregate on level of labor market regions ‡</td>
<td>-0.010*</td>
<td>-0.008</td>
</tr>
<tr>
<td>N=2,156, N(treatment)=48, N(control)=32</td>
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<td>(0.005)</td>
</tr>
<tr>
<td>12. Include control for FX effect</td>
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<td>-0.005***</td>
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<tr>
<td></td>
<td>(0.003)</td>
<td>(0.002)</td>
</tr>
<tr>
<td>13. Separate treatment group by &quot;U.S. Army&quot; vs &quot;Air Force&quot; districts</td>
<td>U.S. WD treatment (%) - Army (N=67)</td>
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<td>(0.003)</td>
<td>(0.002)</td>
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<td></td>
<td>U.S. WD treatment (%) - Air Force (N=3)</td>
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<td>(0.006)</td>
<td>(0.005)</td>
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</tbody>
</table>

* Significant at 10%, ** at 5%, *** at 1%.

State by year dummies: Yes Yes
District x time trends: Yes Yes
District x time trends: No Yes
Conclusion

- Employment

The U.S. drawdown in Germany is associated with significant negative spill-over effects into local private sector employment. The magnitude of the baseline effect is equivalent to a drop of \( \approx 1-2 \) log points in employment growth for the full withdrawal in an average district. The heterogeneity of the effects confirms the higher vulnerability of young, low to middle educated workers in occupations/industries susceptible to suffer most from a drop in local private demand. The dynamic effect pattern indicates that adverse effects persist even several years after the withdrawal. The effects are robust to a number of alternative specifications.
Conclusion

- Employment
  - The U.S. drawdown in Germany is associated with significant negative spill-over effects into local private sector employment.
Conclusion

* Employment
  - The U.S. drawdown in Germany is associated with significant negative spill-over effects into local private sector employment.
  - The magnitude of the baseline effect is equivalent to a drop of $\approx 1-2 \log$ points in employment growth for the full withdrawal in an average district.
Conclusion

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  - The magnitude of the baseline effect is equivalent to a drop of \( \approx 1-2 \) log points in employment growth for the full withdrawal in an average district.
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- Employment
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  - The dynamic effect pattern indicates that adverse effects persist even several years after the withdrawal.
Conclusion

- Employment
  - The U.S. drawdown in Germany is associated with significant negative spill-over effects into local private sector employment.
  - The magnitude of the baseline effect is equivalent to a drop of $\approx 1-2 \log$ points in employment growth for the full withdrawal in an average district.
  - The heterogeneity of the effects confirms the higher vulnerability of young, low to middle educated workers in occupations/industries susceptible to suffer most from a drop in local private demand.
  - The dynamic effect pattern indicates that adverse effects persist even several years after the withdrawal.
  - The effects are robust to a number of alternative specifications.
Conclusion

Employment

- The U.S. drawdown in Germany is associated with significant negative spill-over effects into local private sector employment.
- The magnitude of the baseline effect is equivalent to a drop of ≈1-2 log points in employment growth for the full withdrawal in an average district.
- The heterogeneity of the effects confirms the higher vulnerability of young, low to middle educated workers in occupations/industries susceptible to suffer most from a drop in local private demand.
- The dynamic effect pattern indicates that adverse effects persist even several years after the withdrawal.
- The effects are robust to a number of alternative specifications.

Wages (preliminary)

- The results suggest a downward adjustment of local industry wage growth primarily within small firms
- The effects are heterogeneous across industries
Future work

1. Extensions/Robustness (for wage analysis)
   - More disaggregate industries?
   - Interaction by education group?
   - Influence of collective bargaining agreements/work councils?
   - Dynamic pattern?
Future work

1. Extensions/Robustness (for wage analysis)
   - More disaggregate industries?
   - Interaction by education group?
   - Influence of collective bargaining agreements/work councils?
   - Dynamic pattern?

2. Effects from base land use & location, later redevelopment
Future work

1. Extensions/Robustness (for wage analysis)
   - More disaggregate industries?
   - Interaction by education group?
   - Influence of collective bargaining agreements/work councils?
   - Dynamic pattern?

2. Effects from base land use & location, later redevelopment

3. What are the effects of the stationing & drawdown on individual decision-making?
   - Migration
   - Participation
   - Occupational trajectories, labor turnover
   - Endogeneous skill acquisition
Future work

1. Extensions/Robustness (for wage analysis)
   - More disaggregate industries?
   - Interaction by education group?
   - Influence of collective bargaining agreements/work councils?
   - Dynamic pattern?

2. Effects from base land use & location, later redevelopment

3. What are the effects of the stationing & drawdown on individual decision-making?
   - Migration
   - Participation
   - Occupational trajectories, labor turnover
   - Endogeneous skill aquisition

4. What are the (long-run) effects of the U.S. presence & drawdown on individual preferences, culture?
U.S. Forces in Germany - Total presence

Total U.S. Presence in Germany, 1989-2005
in Thousands

Year/Quarter

Military
Civilian
Dependents

0 100 200 300 400 500 600
Announcement dates

Distribution of 1st announcement dates at Kreis level
(relative to employment reporting dates)
### Descriptive Statistics (2) - Employment distribution

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N: 
- 1990: 70
- 2002: 60
Appendix

Evolution of employment by treatment status, 1975-2004

Ave. total private sector employment, 1975-2004

Note: Levels for 'Treatment' average have been rescaled to match levels for 'Control' in 1990.
Evolution of unemployment rate by treatment status, 1984-2004
### Employment results (2) - Age groups

Dep. Variable: Employment (log) by age group

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<td></td>
<td>(.008)</td>
<td>(.007)</td>
<td>(.002)</td>
<td>(.002)</td>
<td>(.004)</td>
<td>(.004)</td>
</tr>
<tr>
<td><strong>R²</strong></td>
<td>.993</td>
<td>.994</td>
<td>.998</td>
<td>.998</td>
<td>.995</td>
<td>.997</td>
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</table>

### C. - Female

<table>
<thead>
<tr>
<th>Other covariates:</th>
<th>Yes</th>
<th>Yes</th>
<th>Yes</th>
<th>Yes</th>
<th>Yes</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>State by year dummies</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>District x time trends</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>District x time² trends</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

| N | 3,640 | 3,640 | 3,640 | 3,640 | 3,640 | 3,640 |
## Employment results (4) - Selected occupations

### A. All

<table>
<thead>
<tr>
<th>Dep. Variable: Employment (log) in selected occupations</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Craft/construction workers</td>
<td>-.011**</td>
<td>-.010**</td>
<td>-.003</td>
<td>-.005**</td>
<td>-.010*</td>
<td>-.014***</td>
</tr>
<tr>
<td>Clerks/sales workers</td>
<td>(.005)</td>
<td>(.004)</td>
<td>(.003)</td>
<td>(.002)</td>
<td>(.005)</td>
<td>(.005)</td>
</tr>
<tr>
<td>Elem. svcs. workers</td>
<td>.989</td>
<td>.993</td>
<td>.997</td>
<td>.998</td>
<td>.992</td>
<td>.995</td>
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</tbody>
</table>

### B. Male

<table>
<thead>
<tr>
<th>U.S. Military (%)</th>
<th>-.011**</th>
<th>-.010**</th>
<th>-.002</th>
<th>-.002</th>
<th>-.011*</th>
<th>-.021***</th>
</tr>
</thead>
<tbody>
<tr>
<td>R²</td>
<td>.989</td>
<td>.993</td>
<td>.995</td>
<td>.997</td>
<td>.984</td>
<td>.989</td>
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</table>

### C. Female

<table>
<thead>
<tr>
<th>U.S. Military (%)</th>
<th>.004</th>
<th>.004</th>
<th>-.003</th>
<th>-.006**</th>
<th>-.010*</th>
<th>-.012***</th>
</tr>
</thead>
<tbody>
<tr>
<td>R²</td>
<td>.940</td>
<td>.959</td>
<td>.998</td>
<td>.999</td>
<td>.992</td>
<td>.994</td>
</tr>
</tbody>
</table>

**Other covariates:**
- State by year dummies: Yes
- District x time trends: Yes
- District x time² trends: No

<table>
<thead>
<tr>
<th>N</th>
<th>3,640</th>
<th>3,640</th>
<th>3,640</th>
<th>3,640</th>
<th>3,640</th>
<th>3,640</th>
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</thead>
</table>

*aus dem Moore (HU Berlin)*

U.S. Drawdown & Local Labor Markets

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## Employment results (5) - Selected industries

<table>
<thead>
<tr>
<th>Dep. Variable: Employment (log) in selected industries</th>
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<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
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</thead>
<tbody>
<tr>
<td>A. - All</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Construction</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>U.S. Military (%)</td>
<td>-.006</td>
<td>-.004</td>
<td>-.001</td>
<td>-.001</td>
<td>-.011*</td>
<td>-.012*</td>
</tr>
<tr>
<td>(R²)</td>
<td>.989</td>
<td>.993</td>
<td>.995</td>
<td>.997</td>
<td>.994</td>
<td>.996</td>
</tr>
<tr>
<td>Retail/Repair</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>U.S. Military (%)</td>
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<td>.000</td>
<td>.000</td>
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<tr>
<td>(R²)</td>
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<td>.993</td>
<td>.996</td>
<td>.994</td>
<td>.991</td>
<td>.994</td>
</tr>
<tr>
<td>Private hh. services</td>
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<td>U.S. Military (%)</td>
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<td>-.003</td>
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<td>-.013**</td>
<td>-.012**</td>
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<td>.993</td>
<td>.995</td>
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<td>Yes</td>
<td>Yes</td>
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<tr>
<td>Kreis x time trends</td>
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<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
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<td>3,640</td>
<td>3,640</td>
<td>3,640</td>
</tr>
</tbody>
</table>
Bundeswehr reductions 1991-2001