# The Effects of After-School Programs on Maternal Employment

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# Online Appendix

# A. Additional Tables

Table A.1
Pretreatment Correlation

| | (1) Average funding intensity | (2) Avg. yearly changes of funding intensity | (3) Overall change in funding intensity | (4) Funding intensity in 2005 | (5) Funding intensity in 2007 | (6) Funding intensity in 2009 |
|---|---|---|---|---|---|---|
| *Regular employment* | 0.020 | 0.122 | 0.014 | 0.030 | 0.014 | 0.007 |
| | (0.032) | (0.220) | (0.024) | (0.026) | (0.023) | (0.026) |
| *Hours worked* | 0.148 | 0.666 | 0.074 | -0.260 | 0.225 | 0.269 |
| | (0.860) | (5.669) | (0.630) | (0.609) | (0.614) | (0.717) |
| *Age of mother* | -0.662 | -5.648 | -0.628 | -0.015 | -0.494 | -0.630 |
| | (0.600) | (4.504) | (0.500) | (0.505) | (0.447) | (0.457) |
| *Foreign nationality* | 0.097** | 0.395 | 0.044 | 0.079*** | 0.068** | 0.074* |
| | (0.042) | (0.369) | (0.041) | (0.029) | (0.031) | (0.038) |
| *Medium education* | 0.005 | -0.255 | -0.028 | 0.020 | -0.004 | 0.005 |
| | (0.038) | (0.301) | (0.033) | (0.029) | (0.030) | (0.031) |
| *High education* | 0.023 | -0.159 | -0.018 | 0.022 | 0.014 | 0.017 |
| | (0.031) | (0.217) | (0.024) | (0.026) | (0.026) | (0.025) |
| *Single household* | -0.008 | -0.055 | -0.006 | 0.023 | -0.006 | -0.012 |
| | (0.041) | (0.355) | (0.039) | (0.033) | (0.034) | (0.033) |
| *Age of child* | 0.044 | 0.290 | 0.032 | 0.064 | -0.064 | 0.044 |
| | (0.151) | (1.136) | (0.126) | (0.104) | (0.113) | (0.125) |
| *Sex of child* | -0.033 | -0.358 | -0.040 | -0.023 | -0.026 | -0.028 |
| | (0.050) | (0.367) | (0.041) | (0.039) | (0.037) | (0.040) |
| *Younger child* | 0.030 | 0.318 | 0.035 | 0.022 | 0.002 | 0.034 |
| | (0.048) | (0.386) | (0.043) | (0.04) | (0.037) | (0.037) |
| *Number of other children* | -0.045 | -1.236 | -0.137 | 0.035 | -0.004 | -0.071 |
| | (0.114) | (0.827) | (0.092) | (0.094) | (0.087) | (0.085) |
| *GDP ($\div 10^9$)* | 2.483 | 10.439 | 1.160 | 1.773 | 3.876 | 0.999 |
| | (4.053) | (27.939) | (3.104) | (3.526) | (3.917) | (2.769) |
| *Unemployment rate* | 0.006 | -0.023 | -0.003 | $0.3*10^{-4}$ | 0.001 | 0.006 |
| | (0.013) | (0.121) | (0.013) | (0.010) | (0.011) | (0.011) |
| *Avg. employment ratio by women without children* | -0.023** | -0.136 | -0.015 | -0.012 | -0.02** | -0.019** |
| | (0.011) | (0.084) | (0.009) | (0.008) | (0.009) | (0.009) |
| *Avg. hours worked by women without children* | 0.494 | 4.644 | 0.516 | 0.057 | 0.444 | 0.508 |
| | (0.435) | (3.029) | (0.337) | (0.350) | (0.346) | (0.359) |

*Notes*: We regress pretreatment characteristics aggregated at the county level (LHS) on different measures of the funding intensity (RHS). Each coefficient of the table therefore stems from a separate regression, which includes state dummies and all remaining pretreatment characteristics as further controls. The first coefficient of Column (1), for instance, indicates the impact of the average funding intensity on the regular employment dummy. Robust standard errors are presented in parentheses: $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table A.2
Summary Statistics

| | | SOEP | | Microcensus (MZ) | | |
|---|---|---|---|---|---|---|
| | Description | Mean | SD | Mean | SD | Difference |
| ASP attendance | Dummy for ASP attendance | 0.092 | 0.290 | | | |
| Instrument | Ratio of primary schools in a county funded by ASP grants | 0.200 | 0.306 | 0.223 | 0.325 | -0.023*** |
| Instrument (SOEP) vs. instrument lag (MZ) | | 0.200 | 0.306 | 0.207 | 0.311 | -0.007 |
| Hours worked | Weekly hours usually worked | 13.260 | 13.291 | 13.036 | 13.272 | 0.224*** |
| Employment | Regular employment dummy for 10 or more hours worked per week | 0.541 | 0.498 | 0.543 | 0.498 | -0.002 |
| Age of mother | Age of mother in years | 37.936 | 5.285 | 37.940 | 5.360 | -0.004 |
| Foreign nationality | Dummy for foreign nationality | 0.140 | 0.347 | 0.148 | 0.355 | -0.008 |
| Low education | Dummy for low education level *(up to lower secondary education)* | 0.179 | 0.383 | 0.182 | 0.386 | -0.003 |
| Medium education | Dummy for medium education level *(incl. upper secondary education and vocational education)* | 0.689 | 0.463 | 0.693 | 0.461 | -0.004 |
| High education | Dummy for high education level *(college education)* | 0.132 | 0.338 | 0.125 | 0.330 | 0.007 |
| Single household | Dummy for single household | 0.131 | 0.338 | 0.139 | 0.346 | -0.008 |
| Age of child | Age of child in years | 8.033 | 1.225 | 8.014 | 1.285 | 0.019 |
| Sex of child | Dummy for child being male | 0.497 | 0.500 | 0.510 | 0.500 | -0.013 |
| Younger child in household | Dummy for another but younger child than the one in primary school | 0.348 | 0.476 | 0.353 | 0.478 | -0.005 |
| Number of other children | Number of other children living in the household | 1.196 | 0.908 | 1.196 | 0.972 | 0.000 |
| GDP ($\div 10^9$) | GDP in the county of residence in last year | 11.104 | 13.946 | 11.926 | 15.925 | -0.822*** |
| Unemployment rate | Unemployment rate in county of residence in last year | 0.082 | 0.029 | 0.081 | 0.029 | 0.001 |
| Avg. hours worked by women without children | ... in county of residence in last year | 23.340 | 1.980 | 23.448 | 2.035 | -0.108*** |
| Avg. employment ratio by women without children | ... in county of residence in last year | 0.689 | 0.049 | 0.693 | 0.050 | -0.004 |

*Notes*: The SOEP sample includes 5,584 observations and the Microcensus sample 140,071 observations. The last column shows the difference of the mean outcomes of a two-sample independent t-test:$^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table A.3
Summary Statistics of Additional Variables Used in Supplementary Specifications

| | Description | Mean | SD | N |
|---|---|---|---|---|
| Hours worked | Women without child<16 years | 23.88 | 16.84 | 660,978 |
| Employment | Women without child<16 years | 0.72 | 0.45 | 660,978 |
| Hours worked | Mothers with child<5 years | 13.68 | 15.28 | 103,152 |
| Employment | Mothers with child<5 years | 0.49 | 0.50 | 103,152 |
| Actual hours | Actual working hours in last week | 11.83 | 13.48 | 140,071 |
| Employment (0h thrsh.) | Employment dummy if hours worked greater 0 | 0.63 | 0.48 | 140,071 |
| Full-time employment | Dummy for 35 or more hours worked | 0.10 | 0.30 | 140,071 |
| Labor force participation | Dummy for labor force participation | 0.70 | 0.46 | 140,071 |
| Searching for a job | Dummy if someone searches for a job | 0.07 | 0.25 | 140,071 |
| Desired hours if working | Desired working hours if employed | 22.58 | 10.99 | 63,542 |
| Hours if working | Hours worked if employed | 20.64 | 10.95 | 80,235 |
| Fixed-term contract | Dummy for limited working contract | 0.05 | 0.22 | 140,071 |
| Permanent contract | Dummy for unlimited working contract | 0.51 | 0.50 | 140,071 |
| Self-employed | Dummy for being self-employed | 0.05 | 0.22 | 140,071 |
| Dependent employment | Dummy for being dependently employed | 0.53 | 0.50 | 140,071 |
| Household income | Household income of last month | 2,925 | 1,896 | 118,229 |
| Commuting time to work | Minutes to the workplace if commuting | 18.42 | 13.59 | 22,215 |
| Further education | Dummy for vocational training or academic education | 0.01 | 0.12 | 140,071 |
| Fertility | Dummy for having a recently born child | 0.03 | 0.17 | 140,071 |
| Hours worked by father | Father's weekly hours usually worked | 36.38 | 12.79 | 110,091 |
| Employment father | Regular employment for 10 or more hours worked by father | 0.91 | 0.29 | 110,091 |
| Lagged aggr. maternal working hours | Avg. maternal weekly working hours in a county in previous year | 12.85 | 2.39 | 140,071 |
| Lagged aggr. maternal employment | Avg. regular maternal employment in county in previous year | 0.54 | 0.09 | 140,071 |
| GDP per capita ($\div 10^3$) | GDP per capita in the county of residence in previous year | 29.15 | 11.45 | 140,071 |
| Aggr. rate of foreign nationalities | Avg. rate of foreigners in county of residence | 0.08 | 0.04 | 140,071 |
| Region type I | Dummy if agglomeration area | 0.57 | 0.49 | 140,071 |
| Region type II | Dummy if urbanized area | 0.37 | 0.48 | 140,071 |
| Region type III | Dummy if rural area | 0.05 | 0.23 | 140,071 |
| Hours worked before school started | Hours worked during child's last year of kindergarten | 13.01 | 13.74 | 4,458 |
| Employment before school started | Regular employment dummy for 10 or more hours worked during child's last year of kindergarten | 0.52 | 0.50 | 4,458 |
| Care by relatives | Dummy for regular care by relatives | 0.21 | 0.41 | 4,889 |
| Care by friends | Dummy for regular care by friends | 0.04 | 0.21 | 4,889 |
| Paid care | Dummy for regular care by paid person or childminder | 0.04 | 0.19 | 4,889 |

*Notes*: This table includes summary statistics of variables that are used in supplementary specifications.

Table A.4
Mothers' Characteristics by ASP Status

| Panel A: | All mothers | | | Panel B: | Full-time or large part-time mothers: $h > 25$ | | |
|---|---|---|---|---|---|---|---|
| | No ASP | ASP | Difference | | No ASP | ASP | Difference |
| Full-time or large part-time | 0.155 | 0.357 | -0.201*** | High-skilled | 0.213 | 0.277 | -0.064* |
| Part-time | 0.369 | 0.351 | 0.018 | Medium-skilled | 0.668 | 0.614 | 0.053 |
| Non-regular employment | 0.476 | 0.293 | 0.183*** | Low-skilled | 0.119 | 0.109 | 0.011 |
| | | | | Single mothers | 0.204 | 0.283 | -0.078** |
| | | | | Number of other children | 0.789 | 0.489 | 0.300*** |
| | | | | Foreign | 0.110 | 0.114 | -0.004 |
| Panel C: | Part-time mothers: $10 \leq h \leq 25$ | | | Panel D: | Non-regular employment mothers: $h < 10$ | | |
| | No ASP | ASP | Difference | | No ASP | ASP | Difference |
| High-skilled | 0.124 | 0.238 | -0.114*** | | 0.092 | 0.132 | -0.041* |
| Medium-skilled | 0.760 | 0.646 | 0.113*** | | 0.663 | 0.497 | 0.166*** |
| Low-skilled | 0.116 | 0.116 | 0.000 | | 0.245 | 0.371 | -0.126*** |
| Single mothers | 0.098 | 0.221 | -0.123*** | | 0.106 | 0.272 | -0.166*** |
| Number of other children | 0.952 | 0.773 | 0.179*** | | 1.311 | 1.411 | -0.100 |
| Foreign | 0.092 | 0.138 | -0.046** | | 0.181 | 0.245 | -0.064* |

*Notes*: Descriptives are based on the SOEP sample including 5,584 observations. See Table A.2 for further details.

Table A.5
Preferred Specification Showing all Covariates

| | (1) | (2) | (3) |
|---|---|---|---|
| | *1st stage* | *Reduced form* | |
| | ASP attendance | Regular employment | Hours worked |
| *ASP funding rate (instrument)* | 0.2446 (0.0377)*** | -0.0001 (0.0099) | 0.1179 (0.2696) |
| *Age of mother* | -0.0022 (0.0012)* | 0.0014 (0.0004)*** | 0.0154 (0.0112) |
| *Foreign nationality* | 0.0216 (0.0208) | -0.1195 (0.0061)*** | -2.5607 (0.1680)*** |
| *Medium education* | -0.0174 (0.0170) | 0.1829 (0.0050)*** | 4.3297 (0.1298)*** |
| *High education* | 0.0483 (0.0263)* | 0.2993 (0.0074)*** | 9.3909 (0.2193)*** |
| *Single household* | 0.0866 (0.0236)*** | 0.0186 (0.0062)*** | 2.3995 (0.1731)*** |
| *Age of child* | -0.0089 (0.0029)*** | 0.0080 (0.0011)*** | 0.2376 (0.0292)*** |
| *Sex of child* | 0.0065 (0.0096) | -0.0013 (0.0030) | -0.0619 (0.0830) |
| *Younger child* | -0.0081 (0.0125) | -0.1176 (0.0042)*** | -3.1974 (0.1144)*** |
| *Number of other children* | -0.0264 (0.0083)*** | -0.0810 (0.0018)*** | -2.1099 (0.0569)*** |
| *County covariates of the previous year:* | | | |
| *GDP (÷ $10^9$)* | -0.0014 (0.0059) | -0.0021 (0.0013) | 0.0393 (0.0369) |
| *Unemployment rate* | -1.0340 (0.9244) | -0.0298 (0.2673) | -3.5775 (6.7757) |
| *Avg. hours worked by women without children* | 0.0071 (0.0081) | 0.0063 (0.0030 )** | 0.1815 (0.0830)** |
| *Avg. employment ratio by women without children* | -0.0578 (0.2798) | -0.1741 (0.1207) | -6.2765 (3.0542)** |
| *Time dummies* | yes | yes | yes |
| *County fixed effects* | yes | yes | yes |
| *1st stage F-stat.* | 42.197 | | |
| *Observations* | 5,584 | 140,071 | 140,071 |
| $R^2$ | 0.0849 | 0.1215 | 0.1282 |

*Notes*: Regressions are run over the period 2003 to 2012. The sample consists of mothers aged 20 to 60 years who have at least one child in primary school. First-stage and reduced-form estimates are based on the SOEP and the Microcensus, respectively. Standard errors in parentheses are clustered at the county level:$^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table A.6
Heterogeneity – Maternal Characteristics

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| | Maternal age | | | | Foreign nationality | Low education | Medium education | High education |
| | [26-49] | (20-35] | (35-40] | (40-60] | | | | |
| Panel A: 1st stage (SOEP) | *ASP attendance* | | | | | | | |
| Ratio of schools funded by ASP grants | 0.246*** | 0.258*** | 0.201*** | 0.255*** | 0.213** | 0.275*** | 0.232*** | 0.266** |
| | (0.037) | (0.061) | (0.050) | (0.065) | (0.088) | (0.079) | (0.044) | (0.101) |
| 1st stage F-statistic | 43.960 | 17.729 | 16.073 | 15.420 | 5.831 | 12.026 | 27.718 | 6.861 |
| Observations | 5,484 | 1,810 | 2,008 | 1,766 | 779 | 999 | 3,850 | 735 |
| Panel B: Reduced form (Microcensus) | *Hours worked* | | | | | | | |
| Ratio of schools funded by ASP grants | 0.096 | 0.315 | -0.126 | 0.144 | -0.336 | 0.229 | 0.336 | -0.367 |
| | (0.271) | (0.447) | (0.522) | (0.494) | (0.652) | (0.524) | (0.302) | (0.841) |
| | *Employment* | | | | | | | |
| Ratio of schools funded by ASP grants | -0.003 | 0.011 | -0.006 | -0.005 | -0.017 | 0.009 | 0.008 | -0.035 |
| | (0.010) | (0.017) | (0.020) | (0.018) | (0.024) | (0.019) | (0.012) | (0.027) |
| Observations | 137,219 | 44,769 | 50,115 | 45,187 | 20,697 | 25,571 | 97,039 | 17,461 |
| Panel C: TS2SLS (Microcensus / SOEP) | *Hours worked* | | | | | | | |
| Ratio of schools funded by ASP grants | 0.389 | 1.220 | -0.627 | 0.566 | -1.579 | 0.835 | 1.447 | -1.381 |
| | (1.105) | (1.756) | (2.586) | (1.948) | (2.992) | (1.923) | (1.327) | (3.121) |
| | *Employment* | | | | | | | |
| Ratio of schools funded by ASP grants | -0.010 | 0.042 | -0.032 | -0.021 | -0.080 | 0.034 | 0.037 | -0.130 |
| | (0.041) | (0.067) | (0.099) | (0.069) | (0.107) | (0.070) | (0.051) | (0.087) |
| Full set of covariates | yes | yes | yes | yes | yes | yes | yes | yes |

*Notes*: The underlying sample is indicated for each regression separately. First-stage, reduced-form, and TS2SLS regressions are shown separately. The included covariates are the same as in our preferred specification. Standard errors are shown in parentheses: For the first stage and reduced form they are clustered at the county level; for the TS2SLS estimates they are calculated following the delta method.* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A.7
Heterogeneity – Family Characteristics

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | Youngest child in primary school | Children aged 6 or 7 | Only child | Other siblings | Single household | Grandparents close by |
| Panel A: 1st stage (SOEP) | *ASP attendance* | | | | | |
| Ratio of schools funded by ASP grants | 0.245*** | 0.267*** | 0.407*** | 0.208*** | 0.203 | 0.283*** |
| | (0.047) | (0.046) | (0.105) | (0.042) | (0.150) | (0.047) |
| 1st stage F-statistic | 27.730 | 34.421 | 14.915 | 24.713 | 1.833 | 36.309 |
| Observations | 3,640 | 2,088 | 1,038 | 4,546 | 732 | 3,535 |
| Panel B: Reduced form (Microcensus) | *Hours worked* | | | | | |
| Ratio of schools funded by ASP grants | -0.138 | 0.152 | 0.830 | -0.064 | 0.562 | |
| | (0.325) | (0.376) | (0.548) | (0.285) | (0.772) | |
| | *Employment* | | | | | |
| Ratio of schools funded by ASP grants | -0.008 | $-0.4*10^{-3}$ | 0.027 | -0.007 | 0.041 | |
| | (0.012) | (0.014) | (0.019) | (0.011) | (0.025) | |
| Observations | 90,651 | 54,063 | 28,706 | 111,365 | 19,410 | |

*Continued next page*

| Panel C: TS2SLS (Microcensus / SOEP) | | | *Hours worked* | | |
|---|---|---|---|---|---|
| Ratio of schools funded by ASP grants | -0.565 (1.321) | 0.571 (1.411) | 2.038 (1.446) | -0.306 (1.370) | 2.766 (4.318) |
| | | | *Employment* | | |
| Ratio of schools funded by ASP grants | -0.031 (0.047) | -0.001 (0.052) | 0.066 (0.051) | -0.035 (0.052) | 0.201 (0.194) |
| Full set of covariates | yes | yes | yes | yes | yes |

*Notes*: The underlying sample is indicated for each regression separately. First-stage, reduced-form, and TS2SLS regressions are shown separately. The included covariates are the same as in our preferred specification. Standard errors are shown in parentheses: For the first stage and reduced form they are clustered at the county level; for the TS2SLS estimates they are calculated following the delta method.$^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

# B. Robustness Checks

## 1. Simple binary DiD and placebo tests

Before proving the robustness of our preferred specification with a continuous instrument, we present a simple binary DiD approach based on the SOEP sample. To this end, we depart from the graphical evaluation of the main outcomes over time (Figure A.2) as discussed in the context of common time trends in Section IV.D. We define the dummy *after* as one for years after 2003. Counties with *above-median funding intensity* constitute the treatment group. We also include an interaction term between *after* and the treatment variable. The results are shown in Panel A of Table A.8. While in the years after the start of the reform employment rates and hours worked are higher than in the pretreatment period (significant coefficient of the dummy *after*), the coefficients on *above-median funding intensity* and the interaction term are small and insignificant.

Coming back to our main specification with the continuous IV, we start with two placebo tests. We estimate the reduced form for other groups of women to check that our results are not due to differential evolutions in female employment between low- and high-funding counties or interventions that harm female employment in treated counties (or that improve female employment in non-treated regions), setting off a potential ASP effect. As a first test, we estimate our reduced form for women without children. As a second test, we focus on mothers who have a child younger than five, but no older child that could potentially attend a primary school.[47]

[47] In principle, the funding might have a positive effect on mothers of preschool children, and we analyze this aspect in the subsection on timing.

The reduced-form estimates are shown in Columns 1 and 2 of Table A.9. The respective coefficients turn out to be insignificant and close to zero, which strengthens the untestable exogeneity assumption.

**2. Additional control variables and time trends**

In the next set of tests, we add different additional control variables to our preferred TS2SLS specification. First, we aggregate employment variables of mothers with a child in primary school at the county level and add lagged average maternal working hours as well as the lagged regular maternal employment probability to the preferred specification. This is another check to rule out strategic expansion patterns based on changes in maternal demand for ASPs and differential time trends in employment of primary school mothers. Next, we include the share of people of foreign nationalities residing in a county, because this variable is correlated with the funding intensity in cross-sectional county-level regressions (see Subsection III.B). The coefficients of these robustness checks are shown in Columns 3 and 4 of Table A.9. These checks provide similar results as our preferred specification.

The next three robustness checks stress the impact of differential trends in another way. In Germany, federal states can target their educational policies independently. Even with the nationwide investment program, federal states have the option to foster the ASP expansion of certain school types. These funding priorities could be correlated with other state-specific policies that aim to improve the care conditions of primary school children. By including additional year-by-state interactions, we rule out that our instrument takes up any of these confounding trends or shocks. In a similar test, we interact the degree of urbanization with year dummies to account for differences in trends that might have occurred in more rural or urban counties (Wiezorek, Stark, and Dieminger, 2011). Furthermore, we use the first lag of the county's GDP per capita instead of the first lag of the absolute GDP. For these robustness checks, we report the respective results in Columns 5, 6, and 7 of Table A.9. Overall, the coefficients remain insignificant and close to zero.[48]

[48] We also stress the impact of pre-existing linear county-specific trends. Reduced-form estimates on hours worked (0.13) and the employment dummy (0.02) remain close to zero and insignificant.

### 3. Specification adjustments and alternative construction of variables

The subsequent robustness checks show the stability of our results with regard to several alternative specifications. We estimate the reduced form for the regular employment dummy by a probit model (the marginal effect is reported in Column 8 of Table A.9). In Column 9, we restrict the sample to the years 2003 to 2009, when the investment program took place. Next, we redefine the employment dummy. Instead of regular employment, which is defined to be more than 10 working hours, we set the threshold to zero hours. In a further step, we adjust the definition of working hours and consider the actual number of hours that a mother worked during the reference week, instead of referring to the usual number she is supposed to work in a normal week. The coefficients of these last two tests are shown in Column 11 of Table A.9. All these tests are in line with our preferred specification, such that the null hypothesis of a zero effect cannot be rejected.

F-statistics point to a strong first stage, but an IV construction with the number of students in schools instead of school counts may further increase the precision. For the federal states of North Rhine-Westphalia and Baden-Württemberg, we have data that includes the student number for each school, although only for one year. For these two states, we construct an instrument with the number of students in funded schools as the nominator and the overall number of students in the county as the denominator. This suggests the following first-stage result: 0.249 (0.043). Using the same sample (only these two state) with our benchmark instrument gives the following first-stage coefficient: 0.268 (0.043). Consequently, it does not make a difference to take school size into account.

### 4. External child care facilities and moving as potential confounders

We further check whether newly created ASPs crowd out publicly sponsored external child care (*Horte*). In West Germany, the number of available places in external care increased from 2002 by approximately 12,000 places to 192,000 in 2009.[49] There is therefore no evidence at the aggregate level that ASPs have crowded out external care. On the county level, however, the expansion of after-school child care could have been pursued either by ASPs or by publicly sponsored external child care. The use of external child care as an alternative treatment device

[49] See “Child and Youth Services" statistics provided by Destatis (2005) and Destatis (2009).

would be problematic, as it confounds the direct impact of ASPs. To investigate this issue, and similar to our first-stage, we regress children's attendance in a publicly sponsored external child care center on our instrument and all covariates of the preferred specification. The coefficient relating to $z$ is insignificant and close to zero (-0.02).[50] We can therefore not reject the null hypothesis that the allocation of ASP grants is unrelated to external child care center participation. This also alleviates the concern that ASP expansion has been strategically accompanied by counties either through a systematic increase or decrease of external child care places for school-age children. As an additional check, we exclude the states of Bremen, Hamburg, and Hesse from our sample, as they exhibit the highest external child care rates of West German states as of 2012. As outlined in Column 10 of Table A.9, we cannot reject the null hypothesis of a zero effect, which further mitigates the concern of a confounding impact of external child care facilities.

We also analyze the individual moving behavior in the SOEP data to check if mothers strategically relocate to counties with a higher funding ratio. Our first observation is that moving plays a minor role. In our underlying sample, only 1.9% of all mother-child pairs ever change their county of residence. This amounts to 36 relocations in total, which are divided into 16 (13) moves to counties with a higher (lower) funding ratio and seven moves in zero-funded counties. Because the settlement decision is likely to occur at an earlier stage, we also look at mothers whose youngest child is under six years of age. The moving propensity is indeed slightly higher and amounts to 5.8% or 109 moves in total. As for the previous subgroup, we cannot identify a strategic behavior, since 34 (45) mothers move to higher-funded or lower-funded counties and 30 in zero-funded counties.

### 5. Timing: Potential delays in adjustment and anticipation

The last set of robustness checks focuses on timing. We check for delays in maternal labor market adjustment and potential anticipation effects. As summarized in Table A.10, we look at different lead and lag specifications, but find no evidence for a staggered impact of our instrument. Panel A of Table A.10 systematically addresses postponed adjustments. As the

[50] Remember that the first-stage coefficient with ASP participation as an outcome amounts to 0.245.

completion of infrastructural measures may occur with some delay, labor market effects do not have to materialize immediately. Similarly, mothers might require time to adjust to a situation with a new ASP slot at hand. Because our preferred specification may not uncover potential lagged effects, we regress our outcome y in period t on our lagged instrument of period t-s and our usual set of controls in period t. In three separate specifications, we lag the instrument by one (s=1), two (s=2), and three years (s=3), considering our usual outcome measures, that is hours worked and regular employment. Due to multicollinearity issues, we do not further include the instrument of time period t in our lagged specification. Panel A of Table A.10 summarizes the reduced-form estimates of these lagged specifications. In sum, there is no indication of a delayed impact of our instrument on maternal labor market outcomes.

In Panel B and C of Table A.10, we consider specifications that include different leads of our instrument. Mothers could adjust their current labor market attachment in expectation of a future ASP. If mothers see an ASP in construction, this might already impact their current labor supply. That is, they take up or keep a job in expectation of future afternoon child care. Therefore, we regress the employment outcome in period t on the upcoming instrument in period t+s and the usual set of controls in period t. Through this, we also check whether the expansion of ASPs was a response to higher maternal labor market attachment. A significant coefficient of the upcoming instrument in period t+s would therefore cast doubt on the common trend assumption. We conduct this specification using a lead of the instrument by one year (s=1), by two years (s=2), and by three years (s=3). Because anticipation or policy adjustments might occur through mothers with a primary school child or mothers with a child who has not started school yet, we look at both groups. The reduced-form estimates for the three lead specifications and the two groups of mothers are outlined in Panels B and C of Table A.10 considering the usual outcomes, that is hours worked and regular employment. As there are no future observations available for the last periods at the end of the time frame, note that the inclusion of higher leads mechanically reduces the number of observations. Across all specifications of Panels B and C, the coefficients remain small in magnitude and insignificant at conventional levels, which rules out anticipation or policy-adjustment concerns.

# Tables to Robustness Checks

Table A.8
DID – Specifications

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Panel A | Hours worked | Regular employment | | |
| After | 1.618 (0.559)*** | 0.075 (0.020)*** | | |
| Above-median funding intensity | 0.864 (0.703) | 0.028 (0.025) | | |
| Interaction: after*above-median funding intensity | -0.350 (0.789) | -0.015 (0.029) | | |
| Observations | 9,519 | 9,519 | | |
| Panel B | ASP attendance | Care by relatives | Care by friends | Paid care |
| After | 0.018 (0.008)** | -0.037 (0.021)* | -0.006 (0.006) | 0.003 (0.009) |
| Above-median funding intensity | 0.001 (0.009) | -0.001 (0.025) | 0.019 (0.010)* | $0.3*10^{-3}$ (0.010) |
| Interaction: after*above-median funding intensity | 0.090 (0.017)*** | 0.017 (0.029) | -0.002 (0.012) | -0.010 (0.011) |
| Observations | 9,519 | 8,008 | 8,008 | 8,008 |

*Notes*: Each panel shows the coefficients of a difference-in-differences approach using the SOEP sample over the years 1996 to 2012. The included explanatory variables are a binary variable, indicating whether the average funding intensity is above or below median, and another binary variable that specifies the time before and after the start of the investment program. The coefficient of interest is the interaction term of the two previously mentioned dummies and is shown in each column of the table. Standard errors clustered at the county level are shown in parentheses.$^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table A.9
Robustness Checks

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Panel A: 1$^{st}$ stage (SOEP) | | | | | *ASP attendance* | | | | | | |
| Ratio of schools funded by ASP grants | | | 0.245$^{***}$ (0.038) | 0.245$^{***}$ (0.037) | 0.280$^{***}$ (0.080) | 0.257$^{***}$ (0.043) | 0.245$^{***}$ (0.037) | 0.183$^{***}$ (0.042) | 0.252$^{***}$ (0.039) | 0.237$^{***}$ (0.037) | 0.245$^{***}$ (0.038) |
| 1$^{st}$ stage F-statistic | | | 42.178 | 42.897 | 12.229 | 35.878 | 43.012 | | 41.479 | 42.055 | 42.197 |
| Observations | | | 5,584 | 5,584 | 5,584 | 5,584 | 5,584 | 5,584 | 4,255 | 4,732 | 5,584 |
| Panel B: Reduced form (Microcensus) | | | | | | *Hours worked* | | | | | *Actual hours* |
| Ratio of schools funded by ASP grants | 0.083 (0.129) | 0.026 (0.367) | 0.033 (0.219) | 0.110 (0.269) | -0.305 (0.649) | 0.010 (0.283) | 0.140 (0.268) | | 0.089 (0.320) | 0.271 (0.283) | 0.099 (0.262) |
| | | | | | | *Employment* | | | | | *Employment (0h thrsh.)* |
| Ratio of schools funded by ASP grants | 0.004 (0.003) | -0.003 (0.011) | -0.002 (0.008) | $-0.1*10^{-3}$ (0.010) | -0.001 (0.021) | 0.005 (0.011) | $-0.2*10^{-4}$ (0.010) | $-0.1*10^{-3}$ (0.009) | 0.005 (0.012) | $0.4*10^{-3}$ (0.010) | 0.006 (0.010) |
| Observations | 660,978 | 103,152 | 140,071 | 140,071 | 140,071 | 140,071 | 140,071 | 140,071 | 101,664 | 118,269 | 140,071 |
| Panel C: TS2SLS (Microcensus / SOEP) | | | | | | *Hours worked* | | | | | *Actual hours* |
| Ratio of schools funded by ASP grants | | | 0.136 (0.894) | 0.447 (1.097) | -1.090 (2.296) | 0.039 (1.098) | 0.572 (1.100) | | 0.354 (1.272) | 1.141 (1.206) | 0.405 (1.074) |
| | | | | | | *Employment* | | | | | *Employment (0h thrsh.)* |
| Ratio of schools funded by ASP grants | | | -0.010 (0.032) | $-0.2*10^{-3}$ (0.040) | -0.005 (0.076) | 0.019 (0.042) | $-0.1*10^{-3}$ (0.041) | | 0.019 (0.050) | 0.002 (0.044) | 0.024 (0.042) |
| Full set of covariates | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes | yes |
| Additional covariates | | | *Lagged aggr. maternal employment* | *Aggr. rate of foreign nationalities* | *Year-by-state interactions* | *Year-by-region-type interactions* | *Instead of lag GDP, lag GDP per capita* | | | | |
| Specification/ restriction | *Women without child <16 years* | *Mothers with child <5 years* | | | | | | *Probit instead of OLS* | [2003-2009] | *Full sample excl. Hamburg, Bremen, Hesse* | |

*Notes*: Regressions are run over the period from 2003 to 2012. If not otherwise indicated, the sample consists of mothers aged 20 to 60 years who have at least one child in primary school. First-stage, reduced-form, and TS2SLS regressions are shown separately. The included covariates differ across specifications. Standard errors are shown in parentheses: For the first stage and reduced form they are clustered at the county level; for the TS2SLS estimates they are calculated following the delta method.$^{*}$ $p < 0.1$, $^{**}$ $p < 0.05$, $^{***}$ $p < 0.01$.

Table A.10
Timing Analysis

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| Panel A | Hours worked | | | Regular employment | | |
| Lag of 1 year:<br>Ratio of schools funded by ASP grants | 0.080<br>(0.259) | | | -0.003<br>(0.010) | | |
| Lag of 2 years:<br>Ratio of schools funded by ASP grants | | 0.055<br>(0.262) | | | -0.008<br>(0.010) | |
| Lag of 3 years:<br>Ratio of schools funded by ASP grants | | | -0.030<br>(0.276) | | | -0.016<br>(0.010) |
| Observations | 140,071 | 140,071 | 140,071 | 140,071 | 140,071 | 140,071 |
| Sample | Mothers with primary school child | | | | | |
| Panel B | Hours worked | | | Regular employment | | |
| Lead of 1 year:<br>Ratio of schools funded by ASP grants | 0.266<br>(0.304) | | | 0.007<br>(0.012) | | |
| Lead of 2 years:<br>Ratio of schools funded by ASP grants | | 0.282<br>(0.374) | | | 0.013<br>(0.015) | |
| Lead of 3 years:<br>Ratio of schools funded by ASP grants | | | 0.237<br>(0.506) | | | 0.018<br>(0.018) |
| Observations | 127,498 | 114,995 | 101,664 | 127,498 | 114,995 | 101,664 |
| Sample | Mothers with primary school child | | | | | |
| Panel C | Hours worked | | | Regular employment | | |
| Lead of 1 year:<br>Ratio of schools funded by ASP grants | -0.091<br>(0.415) | | | -0.002<br>(0.013) | | |
| Lead of 2 years:<br>Ratio of schools funded by ASP grants | | 0.061<br>(0.523) | | | 0.008<br>(0.016) | |
| Lead of 3 years:<br>Ratio of schools funded by ASP grants | | | -0.037<br>(0.742) | | | 0.008<br>(0.022) |
| Observations | 92,501 | 82,767 | 72,983 | 92,501 | 82,767 | 72,983 |
| Sample | Mothers with youngest child below 5 and no primary school child in household | | | | | |

*Notes*: This table shows reduced-form estimates of the Microcensus, including differently defined lags and leads of our instrument and a full set of covariates. The respective sample composition is indicated for each panel and robust standard errors are presented in parentheses:$^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

# C. Additional Figures

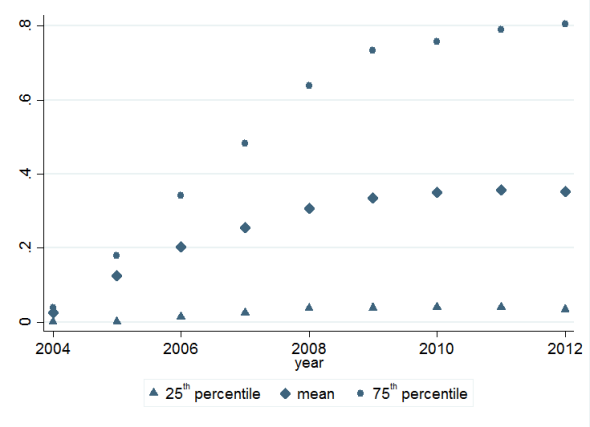
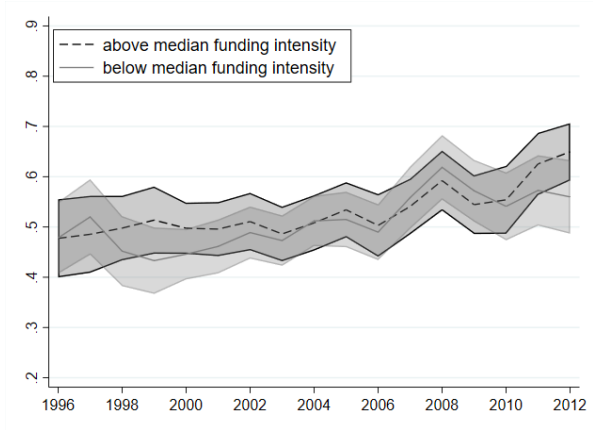


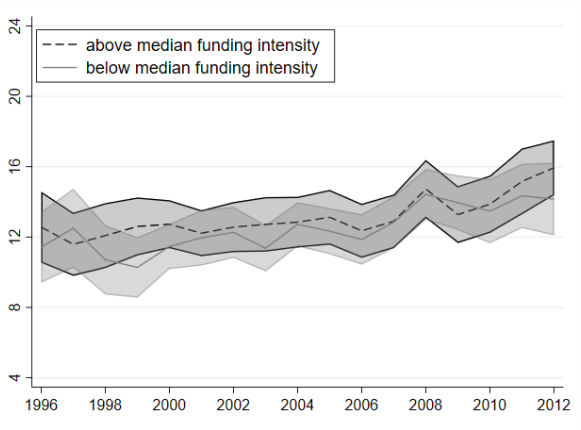

Figure A.1
Evolution of the Instrument Over Time

*Notes*: The graph presents the evolution of the instrument $z$, that is the county-specific ratio of primary schools funded by ASP grants. The $25^{th}$ percentile, the sample mean, and the $75^{th}$ percentile of $z$ are shown separately.

(a) Regular employment rate




(b) Hours worked




(c) ASP attendance rate

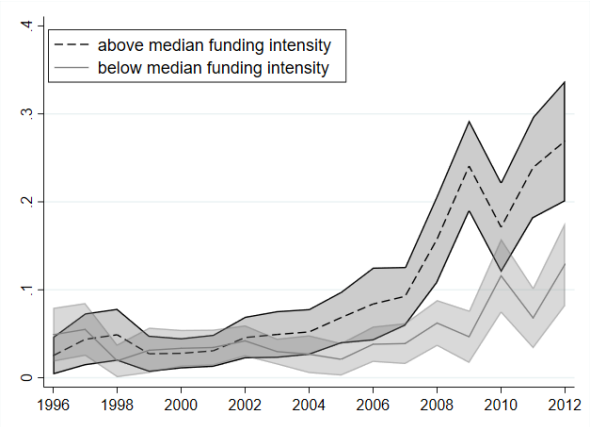
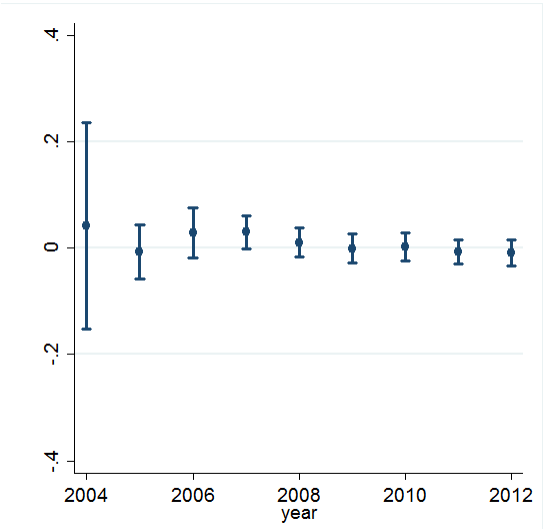



Figure A.2
Evolution of Main Variables Over Time

*Notes*: Figures (a) to (c) show for each outcome the evolution over the years 1996 to 2012 using the SOEP sample. We classify each outcome into two separate groups by below- and above-average median funding intensity.

(a) Regular employment




(b) Hours worked

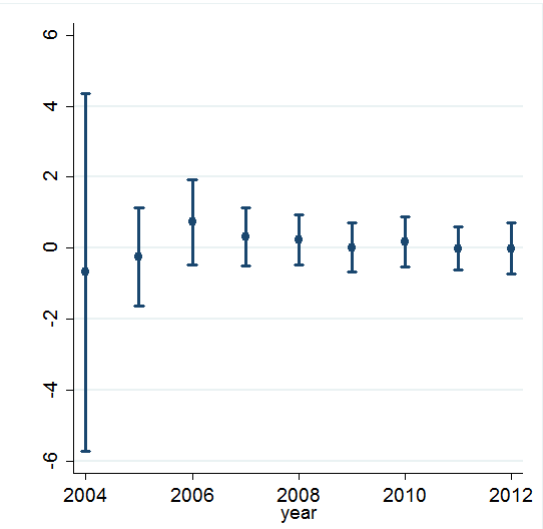



Figure A.3
Dynamic Response of the Effect

*Notes*: Both graphs illustrate the dynamic response of the reduced-form effect for regular employment and hours worked by showing the coefficient of interest as well as the respective 95% confidence interval.