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The stimulative effect of an unconditional block grant on the decentralized provision of care

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Abstract

Understanding the impact of central government grants on decentralized health care provision is of crucial importance for the design of grant systems, yet empirical evidence on the prevalence of flypaper effects in this domain is rare. We study the decentralization of home care in the Netherlands and exploit the gradual introduction of formula-based equalization to identify the effect of exogenous changes in an unconditional block grant on local expenditure and utilization. A one euro increase in central government grants raises local expenditure by fifty cents, while adjustments occur through the number of hours as well as through substitution between basic and more advanced types of assistance. These findings suggest that conditioning of grants is not required for the central government to retain some control over the decentralized provision of care.

1   Introduction

Central governments may use the grant system to steer decentralized health care spending, in order to address externalities or reduce undesired interjurisdictional variation in the level of provision. The conventional economic view is that for grants to have a substantial stimulative effect, they should be made conditional on decentralized spending. Empirical evidence, however, indicates that the stimulative effect of grants with a lump sum nature may also be large. This phenomenon – money sticks where it hits – has been dubbed the flypaper effect. The upshot is that conditioning of grants may not be necessary for the central government to retain some control over decentralized health care provision.

The tendency in the United States has been to reduce conditionality and in particular matching provisions in grants to the states. The reform of the welfare system in the 1990s involved the conversion of matching grants into block grants, notwithstanding the externalities involved in decentralized redistribution.[1] The House of Representatives has recently proposed to convert Medicaid into a block grant. The incentive to limit spending and the lower administrative burden are seen as major advantages, yet opponents fear that resources will be targeted away from individuals or communities with the greatest need toward those with greater political influence.[2] Block grants are already used to fund decentralized health care provision in several other countries.[3]

This paper studies how an unconditional block grant affects the local provision of care in the Netherlands. The particular type of care we consider is assistance in daily housekeeping activities, which enables people with physical or mental health problems to stay in their home environments. This task was decentralized to the local level in 2007. Municipalities were funded by an unconditional block grant. The central government explicitly allowed spending of this grant on other items, in order to provide a maximum incentive to cut costs. The grant was initially set at pre-existing spending levels, yet gradually evolved into an equalizing grant

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[1] The externalities that arise when redistributive policies are decentralized are discussed in e.g., Pauly (1973), Boadway and Wildasin (1984) and Wildasin (1991). These externalities may be addressed through matching grants, where the matching rate corresponds to the magnitude of the externality. Brueckner (2000) reviews the debate on welfare reform in the United States, in which matching grants were converted into block grants, from this angle. See Blank (2002) for a broad evaluation of the reform.

[2] Dilger and Boyd (2014) provide an overview of the political debate on block granting Medicaid in the United States.

[3] Block grants are used to fund decentralized health care provision in Denmark, Finland, Italy, Norway, Spain and Sweden (Rico and Leon 2005, p. 16-18).

based on the variation in spending needs that could be explained by socioeconomic and demographic variables. Furthermore, the equalization scheme was revised in 2011. Our identification strategy exploits the variation in grants induced by these reforms.

We find that the unconditional block grant has stimulated the decentralized provision of care substantially. An exogenous one euro increase raises local expenditure by fifty cents. This result is robust to identifying on each of the grant reforms separately, as well as to several alternative sensitivity checks. We verify that municipalities that receive more grants as a result of the reform also provide more hours of home care per capita, although this effect cannot fully account for the increase in expenditure. Substitution between basic and more advanced types of assistance turns out to be an important margin of adjustment as well.

The wider literature on the stimulative effect of grants on spending has produced broad support for the flypaper effect. While causal interpretation of some of the early work is troubled by identification concerns, several more recent papers that convincingly isolate the impact of exogenous changes in grants also find a considerable impact on spending.[4] This effect is reported for aggregate subnational spending (e.g. Dahlberg et al., 2008; Lundqvist, 2013), as well as for spending on particular items (e.g. Evans and Owens, 2007; Singhal, 2008).[5] Nevertheless, several other papers find that central government grants crowd out local spending, in line with conventional economic theory. In particular, Gordon (2004) reports that US federal grants to school districts based on child poverty are countered by reductions in local government spending within a 3-year period. Lutz (2010) finds that local governments used around 90 cents of court-mandated changes in school grants from the state New Hampshire to reduce taxes. Hence, the flypaper effect is not an empirical law and it likely depends on the institutional context.

Our paper extends this literature to the health care domain. We are not aware of earlier work that identies the impact of exogenous changes in grants on decentralized health care provision. However, federally-mandated changes in Medicaid spending have been found to crowd out other public welfare spending, which also indicates the stickiness of funds within budget categories. Baicker (2001) reports that mandatory spending on particular demographic

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[4] See Hines and Thaler (1995) and Inman (2008) for an overview of the early literature, as well as a discussion of potential explanations for the flypaper effect.
[5] For the Netherlands, Allers and Vermeulen (2014) report a flypaper effect for aggregate local spending.

groups crowds out spending on other demographic groups within the public welfare budget, rather than spending on the same group in different budgetary categories. Craig and Howard (2014) find evidence of crowding out effects even within the Medicaid program, although the response of state governments does depend on what demographic group is affected by the mandated spending change. Policy debates on optimal design of grant systems, both for Medicaid and for decentralized health care provision in other counties, would benefit from more direct evidence on the stimulative effect of grants.

2 Institutional setting

Assistance in daily housekeeping activities (ADHA) enables people with physical or mental health problems to stay in their home environment. It can be permanent or temporary (for instance, after hospitalization). In its most basic variant, ADHA typically involves cleaning and shopping. People with limited mental abilities, such as elderly people suffering from dementia, may also receive more advanced assistance in planning and control of housekeeping activities.

Before the decentralization of ADHA to municipalities, all home care was part of the Exceptional Medical Expenses Act (EMEA) founded in 1968. Health insurers were responsible for provision of EMEA-care to eligible clients, eligibility being determined by a separate government body. Acquisition of EMEA-care was carried out by 32 regional 'health care purchasing agencies', that were often run by the largest health insurer in an EMEA-region. Alternatively, people who were eligible for ADHA could claim a personal budget to buy it from a supplier of their choice.

Regional health care purchasing agencies faced a weak incentive to reduce health care expenditure. They received a regional budget, but were unable to claim any part of the remainder, whereas additional funds were provided if costs exceeded the budget due to exceptional circumstances.[6] The purchased quantities of care were generally based on past quantities and on the capacity of suppliers. In the case of ADHA, this system did result in

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[6] This refers to the organization of the EMEA-act after 2005. Before 2005 the budget constraint was even weaker, as all costs exceeding the budget were covered (Varkevisser *et al.*, 2007).

considerable variation in utilization rates that could not be accounted for by socioeconomic and demographic variables (Cebeon, 2005).

With the installment of the Social Support Act in 2007, the responsibility for determining eligibility and provision of ADHA has been decentralized to municipalities. This act intends municipalities to allocate ADHA only to those who cannot rely on relatives or their social network to help them with domestic chores. Within a certain bandwidth, municipalities can set hourly fees for the use of ADHA, delivered either in kind or through a personal budget. All user fees are collected and redistributed to the municipalities by the Central Administration Office (CAO), which therefore holds detailed records on the use of ADHA.

A new block grant was introduced to compensate municipalities for the new task.[7] This grant, while labeled 'grant for social support', is unconditional and spending it on other items was explicitly allowed (Department of the Interior, 2006a; 2006b).[8] As a result, incentives to curb expenditure on ADHA are stronger for municipalities than for the health purchasing agencies. The distribution of the block grant takes account of several needs indicators, such as population size, number of elderly households, number of single person elderly households and number of households with low incomes.

In order to allow municipalities some time to adjust local provision levels, the formula-based allocation of grants was introduced gradually. In 2007, municipalities received a grant equal to the real expenses made within their boundaries in 2005. In 2008 and 2009, municipalities for which the difference between initial expenditure and the formula-based grant was large received a transition grant. In 2010, the distribution of grants was entirely formula-based. In the remainder of the paper, we will refer to the resulting change in grants per capita relative to 2007 as Reform 1 – a formal definition is deferred to the next section. Figure 1 scatters Reform 1 against the grant per capita received in 2007. It illustrates that grant money was redistributed from municipalities with high initial expenditure to municipalities with low initial expenditure.

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[7] About 85 percent of grant money was received as compensation for the direct costs of ADHA provision, whereas the remainder covered overhead and related costs.
[8] Hence, in the OECD classification, it corresponds to the definition of a block grant (Bergvall et al., 2006).

As the distribution of grants was deemed unsatisfactory, the allocating formula was adjusted in 2011.[9] Indicators for relative income and interaction terms for relative income and the number of single person elderly households were introduced, whereas the weights for other need indicators changed significantly. The reform was accompanied by a transition grant in 2011. Figure 2 plots Reform 2 – the change in grants per capita induced by the new allocating formula – against Reform 1, revealing a significant negative correlation. Municipalities who gained the most from the first reform were particularly negatively affected. Figure 3 illustrates that the combination of both reforms targets municipalities even more precisely with regard to initial expenditure levels.

3   Estimation strategy

We exploit the variation in grants induced by the gradual introduction and subsequent adjustment of the formula-based allocation to identify the stimulative effect of grants on the decentralized provision of care. Equation (1) presents our baseline specification in which the change in provision of ADHA by municipality i between the years 2007 and 2013 (Δh_i) – as measured by either expenditure or the number of hours per capita – is explained by the change in its block grant receipts per capita (ΔG_i) over the same time period.

$$\Delta h_i = C + \beta \Delta G_i + E_r + \varepsilon_i \tag{1}$$

This specification accounts for all time-invariant determinants of municipal ADHA provision through first-differencing. The constant captures shocks that are common to all municipalities, such as the change in the aggregate budget. EMEA-region specific effects E_r are included to control for any variation due to former policies of the regional purchasing agencies. For instance, municipalities in an EMEA-region with a more lenient purchasing agency might find it easier to impose restrictions on the use of home health care, which could confound our estimate of the impact of the change in grants.

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[9] Also, the aggregate budget was reduced in 2011 with 5.5 percent as municipalities substituted more expensive, specialized for basic assistance in daily housekeeping activities in the first years after decentralization (Pommer et al., 2010).

The change in grants is potentially endogenous to changes in socioeconomic and demographic composition, as these changes would correlate with local ADHA provision while entering the allocation formula at the same time. The two reforms discussed in the previous section are therefore used as instruments for ΔG_i. We will define these reforms more precisely below, which requires us to provide a formal characterization of the grant allocation system first.

In 2007, municipalities received a grant based on expenditures by purchasing agencies within their boundaries in 2005. The grant per capita received by municipality i may thus be expressed as $G_i^{2007} = \bar{s}_i^{2005} B^{2007} / P_i^{2007}$, where $\bar{s}_i^{2005}$ denotes the share of the aggregate budget spent within its boundaries in 2005, B^t is the aggregate budget available in year t and P_i^t is the number of inhabitants in this municipality in year t. In 2010 and 2013, in contrast, the allocation of grants was formula-based.[10] Hence, the grant per capita for municipality i in year t (t = 2010, 2013) amounted to $G_i^t = s_i^t \left(X_i^t \right) B^t / P_i^t$, where X_i^t is the realization of a set of need-indicators and $s_i^t(\ )$ is the formula that transforms these indicators into the share of the aggregate budget received by municipality i. This formula is time-dependent, as it was adjusted in 2011.

Equation (2) now defines Reform 1 as the change in grants per capita due to the introduction of the allocation formula. Need-indicators are kept at their 2005 levels in order to deal with the potential endogeneity of changes in socioeconomic and demographic composition.

$$R_i^1 = \left(s_i^{2010} \left(X_i^{2005} \right) - \bar{s}_i^{2005} \right) B^{2007} / P_i^{2005} \tag{2}$$

Similarly, equation (3) defines Reform 2 as the change in grants per capita due to the adjustment of the allocation formula in 2011.

$$R_i^2 = \left(s_i^{2013} \left(X_i^{2005} \right) - s_i^{2010} \left(X_i^{2005} \right) \right) B^{2007} / P_i^{2005} \tag{3}$$

In both definitions, the change in shares is multiplied with the aggregate budget in 2007 and divided by the number of inhabitants in 2005.

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[10] We disregard other years because of the transition grants that municipalities received.

In our main specification we instrument the change in block grant receipts between 2007 and 2013 with the sum of both these reforms. The exclusion restriction is that the resulting total reform, which captures the transition from grants based on initial expenditure to the formula-based distribution in 2013, has influenced changes in ADHA provision only through its impact on grants. However, this assumption is violated when municipal policies in response to the decentralization itself correlate with the reform. For instance, municipalities in which initial ADHA provision was comparably generous may have found it easier or more desirable to cut back expenditure, irrespective of the implied grant reduction. The reform may also correlate with municipal preferences for ADHA.[11]

We address these concerns in several ways. Most importantly, we instrument the change in grants with either of the two reforms separately. The other reform is included as a control variable. If this approach produces similar estimates for either of the reforms, then results can only be biased if omitted variables correlate similarly to both reforms. The strong negative correlation between the reforms (see Figure 2) makes this test particularly meaningful. Omitted variables that correlate positively to the first reform and negatively to the second, or the other way around, would clearly lead to diverging estimates. Furthermore, the included reform should not affect provision of care in the second stage, as its impact operates entirely through the change in grants under our identifying assumption.

As an alternative test, we estimate equation (1) for the time period 2010-2013, identifying the effect of the change in grants using the second reform only. Reform 1 is included as a control variable, which in this specification may pick up lags in the adjustment to the first reform.[12] Potential bias due to correlation of the reforms with municipal policies in response to the decentralization itself is thus reduced to the extent that such policies have already been implemented by 2010.

We further test our identification strategy by entering control variables. In particular, we enter expenditures by purchasing agencies in 2005, as municipalities in which provision of ADHA was generous might find it easier to cut back expenditures. We also include vote shares for

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[11] In particular, one might be concerned that the allocation formula is biased in favor of municipalities that have strong preferences towards ADHA. Municipalities were consulted when the allocation formula was developed. Similarly, Knight (2002) argues that the allocation formula for the Federal Highway Aid Program in the United States favors states with high preferences for highways.

[12] Some municipalities still received transition grants in 2009, so it is certainly conceivable that adjustments to the change in grants took more time than adjustments to the decentralization in 2007.

political parties in the most recent municipal election prior to decentralization as a more direct test for omitted municipal preferences for ADHA. Finally, we separately identify the effect of positive and negative changes in grants, as a test for the possibility that the overall effect is driven by a subgroup of municipalities.

4   Data

Data on municipal expenditures on home care in 2007, 2010 and 2013 is collected from the statistics on the municipality budget provided by Statistics Netherlands (CBS, 2014).[13] We consider the budgeted expenditure on home care and select the 356 municipalities where a positive amount is reported.[14] Total municipal expenditures on ADHA in 2013 equal 1.7 billion or about 0.3 percent of GDP. These data should be treated with some caution, as municipalities provide their budget information voluntarily and no official audit is performed.[15] Nevertheless, random measurement error in the dependent variable does not bias estimation results.

Our other measures of municipal ADHA provision are based on administrative records from the CAO (see section 2) and therefore highly reliable. The CAO registers both the type and the hours of ADHA delivered in-kind. We categorize ADHA into basic and advanced assistance. This allows us to compute the total hours of care help provided by municipalities in 2007, 2010 and 2013, where we can distinguish between both categories. Eight municipalities had to be dropped from the analysis as they did not consistently record utilization of ADHA.[16] In total this leaves us with 400 observations on provision of ADHA in each year.

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[13] The number of municipalities decreased from 443 in 2007 tot 408 in 2013 due to municipal amalmagations. We treat municipal amalmagations in retrospect. Thus if municipalities A and B amalmagated into municipality C in 2008, we treat municipalities A and B as if they had amalmagated in 2007 already.

[14] Realized expenditure on ADHA is provided as well, but these data are considered to be less reliable. Moreover, the 2013 entries on this variable are provisional. We therefore use budgeted expenditure, although it is verified that estimates based on realized expenditure produce similar results.

[15] The correlation coefficient between expenditures and hours of ADHA per capita equals 0.80 in 2007, 0.73 in 2010 and 0.66 in 2013.

[16] In 2007 these municipalities assigned clients a certain number of ADHA, yet in 2013 they assigned clients the right to `a clean house'. These municipalities are Alblasserdam, Dordrecht, Emmen, Hendrik-Ido-Ambacht, Papendrecht, Rotterdam, Sliedrecht and Zwijndrecht.

The CAO also records how many persons use a personal budget. This information allows us to verify whether the reforms induced a change in the use of personal budgets. Furthermore, we observe the total user fee collected by municipalities in 2008 and 2013, levied on users of ADHA delivered in-kind and users of a personal budget in these years.[17] This information is used to verify whether the reforms induced a change in the average fee per user.

Data on the block grant is recorded from overviews of the municipality grant system that have been published by the national administration, see Department of the Interior (2007; 2014). We use the grant receipts and underlying allocation formulae, in combination with the realization of need indicators in 2005, to construct our instruments. The realization of need-indicators in 2005 is collected from Statistic Netherlands. This information is based on municipal administrative records, checked by Statistics Netherland and therefore very reliable.[18] Expenditure on ADHA by purchasing agencies in 2005 is derived from Department of the Interior (2007).

Finally, data on municipal elections is provided by the Electoral Council (2014). We construct the share of votes received by eight national parties that take part in municipal elections most often.[19]

5 Results for expenditure

Table 2 reports our main estimation results with regard to the impact of grants on decentralized ADHA expenditure. The first column in Panel A shows OLS estimates, whereas all other columns show IV results. The estimate in the second column is identified on the sum of both reforms. Results for a specification in which Reform 1 is excluded and Reform 2 is controlled for are shown in the third column and the fourth column reports results for a

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[17] Due to a change in their administrative system, the CAO could not deliver the user fees collected in 2007.

[18] We collect 2005 values of all variables in the allocation formula, except average income and information on beds in nursing homes and hospitals. The former is first measured at the municipal level in 2006 and the latter is only observed for 2004. For three municipalities average income has not been reported by Statistics Netherlands. For these municipalities the relative income-indicator is set to the zero.

[19] These parties include left-wing parties (Groen Links, PvdA, SP), right-wing and liberal parties (D66, VVD), Confessional parties (CDA, CU, SGP) and local parties as a group. Sometimes, two or more of these parties work together and provide one list of candidates. Such combinations are not separately controlled for as it would inflate the number of indicators and often parties decide to work together because they are expected to collect a very small share of the votes on their own.

specification in which Reform 2 is excluded and Reform 1 is controlled for. Panel B contains the corresponding first stage results.

Our baseline result in column two is that fifty cents of each additional euro of grant money are spent on ADHA, while we cannot reject this amount to be between 32 and 68 cents with 95 percent confidence. It does not differ significantly from the OLS estimate in column one, while results identified on either of the two reforms separately are also very similar. We cannot reject the hypothesis that the effect of grants based on Reform 1 and Reform 2 are equal, which validates our identification strategy. The statistical insignificance of the reforms that are included in the second stage also supports the assumption that their impact on expenditure runs entirely through the change in grants.[20]

In all IV-equations the instrument is highly relevant as indicated by the high Kleibergen-Paap F-statistic. Also, in the first stage, parameter estimates are significant at the one percent level and close to one. Thus a change in our instrument with one euro leads to a change in grant with about one euro. This also validates our identification strategy, as an estimated parameter different from one would imply that part of the variation in grants would be due to other factors that correlate with the reform and that might be endogenous (see e.g. Lundqvist, 2013).[21]

In columns one and two of Table 3 we present estimation results for the 2010-2013 period. The first column is based on OLS and Reform 2 is used as an instrument in the second column, while Reform 1 is entered as a control variable. The estimated effect is somewhat lower, but it does not differ significantly from our preferred specification in column 2 in Table 2. Hence, it appears that municipalities used the 2010-2013 period to adjust spending on ADHA to the 2011 reform of the grant allocation formula. This further discounts the possibility that our baseline estimate of the grant effect is driven by a correlation of Reform 2 with municipal policies in response to the decentralization in 2007.

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[20] Appendix Table A1 verifies that using realized instead of budgeted expenditure produces similar results. See footnote 14.

[21] For completeness, the first column of Appendix Table A2 shows results based on a reduced form specification in which the change in expenditure is directly regressed on both reforms. We cannot reject the hypothesis that the effect of the first and second reform is equal to our preferred estimate in Table 2.

We subject our baseline estimate in Table 2 to various alternative sensitivity checks. In the first two columns of Appendix Table A3 we condition on expenditures on ADHA by purchasing agencies in 2005 to control for the possibility that municipalities with a high historic level of ADHA provision might find it easier to cut back costs. Although not significant at the five percent level, the point estimate indicates that after controlling for the effect of grants, municipalities with high historic spending levels have rather increased spending on ADHA. The effect of the change in grants is not significantly different from the baseline estimate in Table 2.

In Appendix Table A4 we provide estimation results where we explicitly condition on local preferences using the composition of the municipal council in 2007. The effect of the change in grants on expenditure is reported in the first and second columns, using either OLS or an IV based on the total reform. Results are nearly identical to our baseline estimate in Table 2. The F-test on the joint significance of the indicators for municipal composition is insignificant. This lends further support to the hypothesis that the effect of grants on provision of ADHA is not influenced by unobserved municipal preferences.

Appendix Table A5 shows results for specifications in which the effect of grants is allowed to differ between municipalities who saw grants increase due to the reform and those who faced a decrease in grant receipts. We cannot reject the null hypothesis that positive and negative shocks have a similar effect on expenditures. This provides a further indication that the overall effect is not driven by a subgroup of municipalities.

6   Margins of adjustment

This section provides evidence on the channels through which municipalities realize grant-induced changes in expenditure. In particular, Table 4 presents evidence on the impact of changes in grants on changes in the number of hours of ADHA provided. It has the same setup as Table 2.

Our baseline estimate in column 2 implies that a change in grant with one euro per capita increases hours of ADHA provided with 0.8 minutes per capita. Based on a survey collected from 391 municipalities, Van der Torre et al. (2011) report that the average price of ADHA

was about 23 euro per hour.[22] This back-of-the-envelope calculation suggests that an additional euro of grant receipts increases municipal expenditures on ADHA with about 30 cents. It thus seems that the change in hours cannot fully account for the change in expenditure, although the effect is just below the lower bound of 32 cents for each additional euro of block grant receipts.

This baseline estimate is robust to the same sensitivity checks as our estimate of the impact of grants on expenditure. In particular, identifying on either of the reforms separately yields similar results, as shown in the third and fourth columns of Table 4, whereas coefficients in the first stage are close to one.[23] Table 5 shows estimation results for the 2010-2013 period. The IV-estimate in column two is nearly identical to our preferred estimate in Table 4. Furthermore, the effect of Reform 1 indicates that some of the adjustment to this reform, which only came fully into effect in 2010 because of the transition grants in earlier years, has taken place in the period 2010-2013.

Appendix Table A3 shows expenditures by purchasing agencies in 2005 do not influence the change in hours of ADHA provided, nor does this control significantly alter the estimated effect of the change in grants. Controlling for vote shares of political parties does not affect results either, as shown in the third and fourth columns of Appendix Table A4. Finally, Appendix Table A5 shows that positive and negative shocks in grants had similar effects on the hours of ADHA provided.

One potential explanation for our finding that the change in hours cannot fully account for the change in expenditure, when hours are valued at a constant price, is that municipalities may have changed the composition of ADHA in response to a change in grants. Table 6 provides evidence on the effect of unconditional block grants on the provision of hours of basic assistance (Panel A) and advanced assistance (Panel B). In our baseline specification in column two, the impact of changes in grants on changes in hours of basic assistance is statistically insignificant, whereas the impact on changes in hours of advanced assistance is statistically significant at the 1 percent level. Moreover, it is quantitatively comparable to the

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[22] Van der Torre et al. (2011) report average prices for basic and advanced assistance for a group of 224 reliable municipalities and adjusted prices for a group of 169 other municipalities in 2010. The weighted average price per hour equals 20.71 for basic assistance and 23.25 euro per hour for advanced assistance.
[23] The second column of Appendix Table A2 shows results based on a reduced form specification in which the change in hours per capita is directly regressed on both reforms. We cannot reject the hypothesis that the effect of the first and second reform is equal to our preferred estimate in Table 4.

effect on total hours of ADHA presented in Table 4, implying that the change in hours of ADHA reported in Table 4 is predominantly driven by the impact of grants on the supply of advanced types of ADHA.

The sensitivity checks reported in the third and fourth columns of Table 6 indicate that these estimates should be considered with some caution. Identification on Reform 2 produces estimates that are statistically distinct from estimates identified on Reform 1, or on the sum of both reforms. This indicates that omitted variables correlate with one of these reforms and with changes in the provision of basic and advanced assistance.[24] Results for the change in hours of basic and advanced ADHA over the period 2010-2013, reported in Table 7, are in line again with the baseline estimate in column 2 of Table 6. One consistent finding in all these specifications, though, is that the stimulative effect of grants is considerably larger for advanced ADHA than for basic ADHA.[25] Hence, substitution between these types of assistance turns out to be an important margin of adjustment.

Finally, we verify the role of personal budgets and user fees as a channel of adjustment. In-kind delivery may have been substituted for personal budgets in response to a change grant, so that the impact of grants on the overall number of hours of ADHA per capita is overestimated. However, Appendix Table A6 shows we cannot reject the null hypothesis that there is no relationship between the change in grants and the change in the percentage of people in a municipality with a personal budget. This result is robust to identification on the first reform, the second reform or the sum of both reforms. Therefore, we conclude it is unlikely that in-kind service delivery is substituted with personal budgets in response to changes in grants.

Municipalities may also have altered the user fee for ADHA in response to changes in grants. A negative relationship between the change in the average fee per hour of ADHA and the change in grant would suggest that part of the grant money is transferred to users of ADHA in the form of lower contributions. Appendix Table A7 presents no evidence in favor of such a

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[24] The third and fourth columns of Appendix Table A2 shows results based on a reduced form specification in which the change in hours per capita of basic and advanced ADHA is directly regressed on both reforms, which are consistent with results reported in Table 6.

[25] If Reform 1 were confounded and our estimate based on Reform 2 unbiased, then the importance of the composition in terms of ADHA quality as a margin of adjustment would become even stronger. If identification of grants is based on Reform 2, we find that each euro per capita increase in grants reduces hours of assistance provided with 0.9 minutes per capita, while the effect on advanced assistance doubles in magnitude relative to the baseline estimate.

relationship, irrespective of the reform used for identification. Hence, it appears that user fees have not been adjusted in response to a change in grant either.

7   Conclusions and implications for policy

We exploit the gradual introduction of formula-based equalization to identify the effect of exogenous changes in an unconditional block grant on local provision of home care in the Netherlands. A one euro increase in grants raises local expenditure by fifty cents, while adjustments occur through the number of hours as well as through substitution between basic and more advanced types of assistance. These empirical findings are robust to a range of sensitivity checks. We thus demonstrate the presence of a flypaper effect in a domain in which evidence on the stimulative effect of grants is rare.

Unconditional block grants give subnational governments leeway in the allocation of funds over programs and instruments, while minimizing the administrative burden. Moreover, this type of funding creates strong incentives for subnational governments to limit spending, which is not unimportant in view of steep upward trends in health care spending in many OECD countries.[26] Stickiness of grants to budget categories implies that in contrast to conventional economic theory, the central government may reap these advantages without fully giving up its control over decentralized health care provision – an insight that may of relevance beyond the context of decentralized provision of home care in the Netherlands. On the downside, however, it also indicates that subnational leeway over expenditure and the incentive to curb spending may not be as large in reality as expected on the basis of conventional economic theory.

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[26] See for instance Chernew and Newhouse (2012) for an overview and discussion of underlying factors.

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Tables

Table 1: Summary Statistics

	N	mean	sd	min	max
2013					
Expenditures ADHA	400	106.14	30.54	19.47	210.57
Hours ADHA	400	3.20	0.88	1.21	6.24
Grant	408	94.14	17.93	42.74	154.31
Hours basic ADHA	400	2.26	0.88	0.00	5.30
Hours advanced ADHA	400	0.95	0.81	0.00	4.87
Users personal budget (per 10,000)	400	1.34	4.91	0.00	39.61
User fee (per hour ADHA)	391	6.31	1.57	3.43	14.91
Change 2007-2013					
Expenditures ADHA	356	22.83	25.65	-52.98	146.40
Hours ADHA	400	0.16	0.64	-3.49	1.76
Grant	408	3.12	18.16	-58.30	57.01
Hours basic ADHA	400	1.26	0.91	-1.91	4.18
Hours of advanced ADHA	400	-1.10	0.83	-3.51	1.72
Users personal budget (per 10,000)	400	1.17	4.92	-16.82	39.61
User fee (per hour ADHA, 2008-2013)	388	2.15	1.78	-11.28	11.56
Change 2010-2013					
Expenditures ADHA	392	1.34	18.88	-113.99	95.93
Hours ADHA	400	-0.09	0.50	-3.92	1.67
Grant	408	-4.47	9.36	-52.94	17.73
Hours basic ADHA	400	0.30	0.73	-3.04	3.12
Hours of advanced ADHA	400	-0.39	0.65	-3.02	2.53
Users personal budget (per 10,000)	400	-1.44	6.98	-95.94	18.51
User fee (per hour ADHA, 2008-2013)	391	2.03	1.03	-2.00	10.94
Instruments and predetermined					
Reform 1	408	1.35	19.75	-73.24	65.75
Reform 2	408	1.14	8.31	-58.99	16.51
Reform 1 + Reform 2	408	2.48	18.39	-64.71	57.72
Expenditures on ADHA in 2005	408	84.68	25.58	37.25	171.21

All variables per inhabitant in 2005 unless indicated otherwise.

Table 2: Effect on expenditures

A: Second stage results	Δ Expenditures			
	(1)	(2)	(3)	(4)
Δ Grant	0.565***	0.500***	0.500***	0.499**
	(0.0921)	(0.0969)	(0.105)	(0.199)
Reform 1				0.00115
				(0.222)
Reform 2			-0.00131	
			(0.253)	
Observations	356	356	356	356
Method	OLS	IV	IV	IV
R^2	0.212			
Kleibergen-Paap F		1886.1	1728.1	645.1
B: First stage results	Δ Grant			
Reform 1 + Reform 2	0.961***			
	(0.0221)			
Reform 1			0.952***	0.952***
			(0.0229)	(0.0229)
Reform 2			1.087***	1.087***
			(0.0428)	(0.0428)

Expenditures, grant and reforms measured in real euro per inhabitant in 2005. Change in grant and expenditures over the period 2007 - 2013. Robust standard errors in parentheses. $^*p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$. Constant and EMEA-region fixed effects not shown in OLS estimates and partialled out in IV estimates.

Table 3: Results expenditures ADHA, 2010-2013

A: Second stage results	Δ Expenditures	
	(1)	(2)
Δ Grant 2010-2013	0.331	0.391**
	(0.230)	(0.192)
Reform 1	0.0430	0.0505
	(0.0751)	(0.0764)
Observations	392	392
Method	OLS	IV
R^2	0.0920	
Kleibergen-Paap F		67.92
B: First stage results	Δ Grant 2010-2013	
Reform 1		-0.00570
		(0.0211)
Reform 2		0.823***
		(0.0999)

Expenditures, grant and reforms measured in real euro per inhabitant in 2005. Change in grant, expenditures on ADHA over the period 2010 - 2013. Robust standard errors in parentheses. $^*p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$. Constant and EMEA-region fixed effects not shown in OLS estimates and partialled out in IV estimates.

Table 4: Effect on provision of hours ADHA

A: Second stage results	Δ Hours ADHA			
	(1)	(2)	(3)	(4)
Δ Grant	0.0131***	0.0136***	0.0135***	0.0145***
	(0.00223)	(0.00240)	(0.00247)	(0.00360)
Reform 1				-0.000926
				(0.00328)
Reform 2			0.00107	
			(0.00378)	
Observations	400	400	400	400
Method	OLS	IV	IV	IV
R^2	0.320			
Kleibergen-Paap F		2182.6	2056.6	757.7
B: First stage results	Δ Grant			
Reform 1 + Reform 2	0.954***			
	(0.0204)			
Reform 1			0.944***	0.944***
			(0.0208)	(0.0208)
Reform 2			1.091***	1.091***
			(0.0396)	(0.0396)

Hours ADHA measured in hours per inhabitant in 2005, grant and reforms measured in real euro per inhabitant in 2005. Change in grant and hours ADHA over the period 2007 - 2013. Robust standard errors in parentheses. $^*p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$. Constant and EMEA-region fixed effects not shown in OLS estimates and partialled out in IV estimates.

Table 5: Results on provision of hours ADHA, 2010-2013

A: Second stage results	Δ Hours ADHA	
	(1)	(2)
Δ Grant 2010-2013	0.00861***	0.0136***
	(0.00278)	(0.00329)
Reform 1	0.0114***	0.0120***
	(0.00195)	(0.00195)
Observations	400	400
Method	OLS	IV
R^2	0.320	
Kleibergen-Paap F		64.36
B: First stage results	Δ Grant 2010-2013	
Reform 1		-0.00478
		(0.0228)
Reform 2		0.814***
		(0.102)

Hours ADHA measured in hours per inhabitant in 2005. Grant and reforms measured in real euro per inhabitant in 2005. Change in grant and hours of ADHA over the period 2010 - 2013. Robust standard errors in parentheses. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$. Constant and EMEA-region fixed effects not shown in OLS estimates and partialled out in IV estimates.

Table 6: Effect on provision of basic and advanced ADHA

A: Second stage results	Δ Hours basic ADHA			
	(1)	(2)	(3)	(4)
Δ Grant	0.00124	-0.000311	0.000911	-0.0147**
	(0.00292)	(0.00300)	(0.00297)	(0.00575)
Reform 1				0.0147***
				(0.00510)
Reform 2			-0.0170***	
			(0.00562)	
Observations	400	400	400	400
Method	OLS	IV	IV	IV
R^2	0.423			
Kleibergen-Paap F		2182.6	2056.6	757.7

B: Second stage results	Δ Hours advanced ADHA			
	(1)	(2)	(3)	(4)
Δ Grant	0.0118***	0.0139***	0.0126***	0.0292***
	(0.00272)	(0.00277)	(0.00273)	(0.00500)
Reform 1				-0.0157***
				(0.00428)
Reform 2			0.0181***	
			(0.00454)	
Observations	400	400	400	400
Method	OLS	IV	IV	IV
R^2	0.453			
Kleibergen-Paap F		2182.6	2056.6	757.7

Hours basic and advanced ADHA measured in hours per inhabitant in 2005, grant and reforms measured in real euro per inhabitant in 2005. Change in grant and hours of basic and advanced ADHA over the period 2007 - 2013. Robust standard errors in parentheses. $^*p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$. Constant and EMEA-region fixed effects not shown in OLS estimates and partialled out in IV estimates. First stage results are presented in table 3.

Table 7: Effect on provision of basic and advanced ADHA, 2010-2013

A: Second stage results	Hours basic assistance		Hours advanced assistance	
	(1)	(2)	(3)	(4)
Δ Grant 2010-2013	0.00296	-0.00723	0.00565	0.0209***
	(0.00399)	(0.00651)	(0.00368)	(0.00694)
Reform 1	0.00807***	0.00675***	0.00329	0.00526**
	(0.00267)	(0.00262)	(0.00226)	(0.00224)
Observations	400	400	400	400
Method	OLS	IV	OLS	IV
R^2	0.368		0.371	
Kleibergen-Paap F		64.36		64.36
B: First stage results				
Reform 1		-0.00478		-0.00478
		(0.0228)		(0.0228)
Reform 2		0.814***		0.814***
		(0.102)		(0.102)

Hours basic and advanced ADHA measured in hours per inhabitant in 2005, grant and reforms measured in real euro per inhabitant in 2005. Change in grant and hours of basic and advanced ADHA over the period 2010 - 2013. Robust standard errors in parentheses. $^*p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$. Constant and EMEA-region fixed effects not shown in OLS estimates and partialled out in IV estimates.

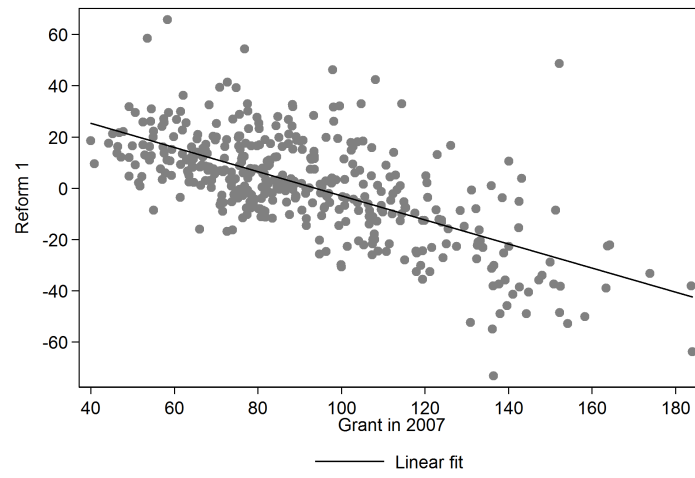**Figures**

Figure 1: Reform 1 to initial grant
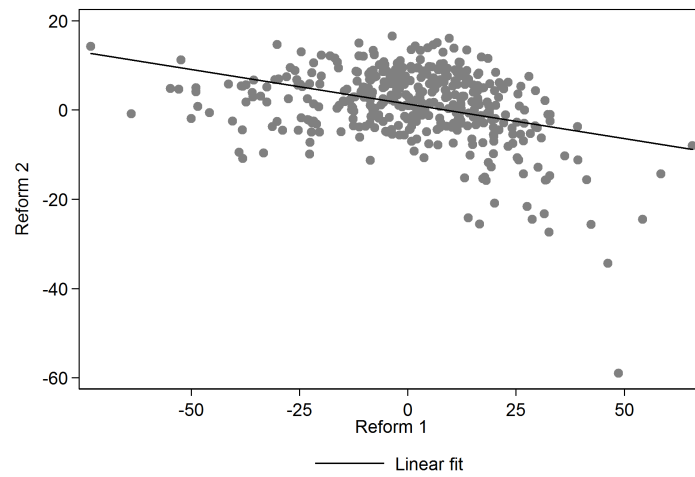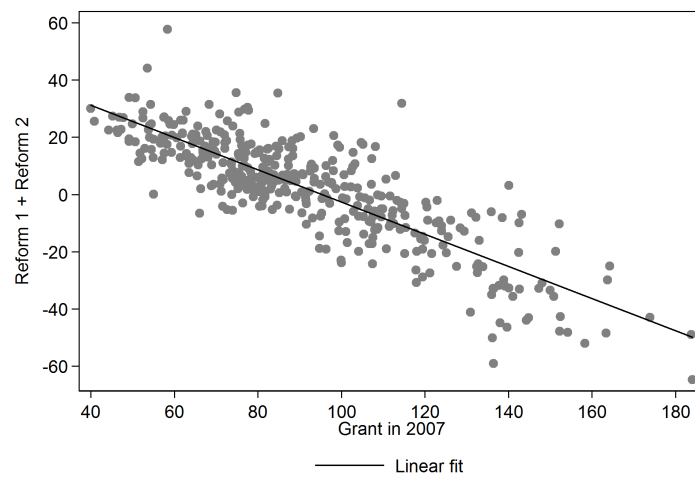

Figure 2: Reform 2 to Reform 1

Figure 3: Reform 1 + Reform 2 to initial grant

A Appendix tables

Table A1: Effect on realized expenditures

A: Second stage results		Δ Expenditures		
	(1)	(2)	(3)	(4)
Δ Grant	0.411***	0.387***	0.393***	0.305*
	(0.0695)	(0.0748)	(0.0775)	(0.160)
Reform 1				0.0839
				(0.156)
Reform 2			-0.0964	
			(0.180)	
Observations	389	389	389	389
Method	OLS	IV	IV	IV
R^2	0.207			
Kleibergen-Paap F		2392.7	2246.4	760.6
B: First stage results		Δ Grant		
Reform 1 + Reform 2		0.955***		
		(0.0195)		
Reform 1			0.946***	0.946***
			(0.0200)	(0.0200)
Reform 2			1.086***	1.086***
			(0.0394)	(0.0394)

Realized expenditures are provisional in 2013. Expenditures, grant and reforms per inhabitant in 2005. Change in grant and expenditures over the period 2007 - 2013. Robust standard errors in parentheses. $^*p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$. Constant and EMEA-region fixed effects not shown in OLS estimates and partialled out in IV estimates.

Table A2: Reduced form equations

	Δ Expenditures (1)	Δ Hours ADHA (2)	Δ Hours basic ADHA (3)	Δ Hours advanced ADHA (4)
Reform 1	0.477***	0.0128***	0.000860	0.0119***
	(0.106)	(0.00243)	(0.00293)	(0.00266)
Reform 2	0.543**	0.0158***	-0.0160**	0.0318***
	(0.226)	(0.00416)	(0.00631)	(0.00522)
Observations	356	400	400	400
Method	OLS	OLS	OLS	OLS
R^2	0.180	0.318	0.439	0.490

All hours ADHA measured in hours per inhabitant in 2005. Expenditures and reforms measured in real euro per inhabitant in 2005. Change in expenditures and hours of ADHA over the period 2007 - 2013. Robust standard errors in parentheses. $^*p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$. Constant and EMEA-region fixed effects not shown.

Table A3: Results conditional on historic expenditures

A: Second stage results	Δ Expenditures		Δ Hours ADHA	
	(1)	(2)	(3)	(4)
Δ Grant	0.807***	0.740***	0.0110***	0.0116***
	(0.175)	(0.166)	(0.00294)	(0.00331)
Expenditures on ADHA in 2005	0.251*	0.212*	-0.00208	-0.00177
	(0.140)	(0.120)	(0.00217)	(0.00212)
Observations	356	356	400	400
Method	OLS	IV	OLS	IV
R^2	0.227		0.322	
Kleibergen-Paap F		1080.6		1017.6

B: First stage results	Δ Grant	
Reform 1 + Reform 2	1.045***	1.032***
	(0.0318)	(0.0323)
Expenditures on ADHA in 2005	0.0772***	0.0703***
	(0.0247)	(0.0238)

Hours ADHA measured in hours per inhabitant in 2005. Expenditures, grant and reforms measured in real euro per inhabitant in 2005. Change in expenditures and hours of ADHA over the period 2007 - 2013. Robust standard errors in parentheses. $^*p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$. Constant and EMEA-region fixed effects not shown in OLS estimates and partialled out in IV estimates.

Table A4: Results conditional on share main parties in municipal council

A: Second stage results	Δ Expenditures		Δ Hours ADHA	
	(1)	(2)	(3)	(4)
Δ Grant	0.572***	0.516***	0.0133***	0.0137***
	(0.0929)	(0.0957)	(0.00225)	(0.00234)
Votes shares (8)	YES	YES	YES	YES
Observations	356	356	400	400
Method	OLS	IV	OLS	IV
R^2	0.232		0.327	
Kleibergen-Paap F		1912.0		2233.2
F-test composition council (p-value)	.6805	.643	.7927	.736
B: First stage results		Δ Grant		
Reform 1 + Reform 2		0.964***		0.962***
		(0.0221)		(0.0204)

Hours ADHA measured in hours per inhabitant in 2005. Expenditures, grant and reforms measured in real euro per inhabitant in 2005. Change in grant, expenditures and hours ADHA over the period 2007 - 2013. Robust standard errors in parentheses. $^*p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$. Vote shares for eight political parties in the municipal council not shown. Constant and EMEA-region fixed effects not shown in OLS estimates and partialled out in IV estimates.

Table A5: Results, asymmetric response

A: Second stage results	Δ Expenditures		Δ Hours ADHA	
	(1)	(2)	(3)	(4)
Δ Grant, pos. shock	0.576***	0.618***	0.0112***	0.00976***
	(0.189)	(0.155)	(0.00310)	(0.00333)
Δ Grant, neg. shock	0.555***	0.406**	0.0150***	0.0171***
	(0.170)	(0.175)	(0.00412)	(0.00443)
Observations	356	356	400	400
Method	OLS	IV	OLS	IV
R^2	0.212		0.321	
Kleibergen-Paap F		448.2		564.2
P-value pos. shock = neg. shock	.947	.4358	.5146	.2398

B: First stage results	Δ Grant, pos. shock	Δ Grant, pos. shock
Reform 1 + Reform 2, pos. shock	1.049***	1.021***
	(0.0352)	(0.0304)
Reform 1 + Reform 2, neg. shock	-0.0123	-0.0102
	(0.0224)	(0.0208)

C: First stage results (continued)	Δ Grant, neg. shock	Δ Grant, neg. shock
Reform 1 + Reform 2, pos. shock	-0.0321	-0.0191
	(0.0243)	(0.0200)
Reform 1 + Reform 2, neg. shock	0.934***	0.925***
	(0.0261)	(0.0256)

Hours ADHA measured in hours per inhabitant in 2005. Expenditures, grant and reforms measured in real euro per inhabitant in 2005. Change in grant, expenditures and hours ADHA over the period 2007 - 2013. Robust standard errors in parentheses. $^*p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$. Constant and EMEA-region fixed effects not shown in OLS estimates and partialled out in IV estimates.

Table A6: Results user rate personal budget

Second stage results	Δ User rate personal budget			
	(1)	(2)	(3)	(4)
Δ Grant	0.00958	0.0168	0.0218	-0.0420
	(0.0217)	(0.0205)	(0.0211)	(0.0367)
Reform 1				0.0603*
				(0.0354)
Reform 2			-0.0696*	
			(0.0409)	
Observations	400	400	400	400
Method	OLS	IV	IV	IV
R^2	0.170			
Kleibergen-Paap F		2182.6	2056.6	757.7

User rate personal budget per 10.000 inhabitants, grant and reforms measured in real euro per inhabitant in 2005. Change in grant and user rate personal budget over the period 2007 - 2013. Robust standard errors in parentheses. $^*p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$. Constant and EMEA-region fixed effects not shown in OLS estimates and partialled out in IV estimates. First stage results are presented in table 3.

Table A7: Effect on user fee per hour

A: Second stage results	Δ User fee per hour ADHA			
	(1)	(2)	(3)	(4)
Δ Grant	-0.00706	-0.00839	-0.00870	-0.00467
	(0.00579)	(0.00603)	(0.00621)	(0.00938)
Reform 1				-0.00380
				(0.00875)
Reform 2			0.00440	
			(0.0102)	
Observations	388	388	388	388
Method	OLS	IV	IV	IV
R^2	0.156			
Kleibergen-Paap F		2114.9	1999.8	731.1
B: First stage results	Δ Grant			
Reform 1 + Reform 2	0.954***			
	(0.0207)			
Reform 1			0.944***	0.944***
			(0.0211)	(0.0211)
Reform 2			1.091***	1.091***
			(0.0404)	(0.0404)

Hours ADHA measured in hours per inhabitant in 2005. Expenditures, grant and reforms measured in real euro per inhabitant in 2005. Change in grant over the period 2007 - 2013, change in user fee per hour ADHA over the period 2008 - 2013. Robust standard errors in parentheses. $^*p < 0.10,^{**}p < 0.05,^{***}p < 0.01$. Constant and EMEA-region fixed effects not shown in OLS estimates and partialled out in IV estimates.