Stimulating Local Economies through Central Transfers: A Natural Experiment from Ecuador – Supplemental Material –

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A Model of Territorial Equity

Ecuador introduced the Model of Territorial Equity (MET)[1] in 2011 under the framework of the Organic Code of Territorial Organization, Autonomy, and Decentralization (COOTAD)[2]. The MET seeks to guarantee the equitable distribution of state revenues among decentralized autonomous governments (GADs), which include provincial councils, municipalities, and rural parish councils. The MET is financed with 21% of permanent revenues (e.g., tax income) and 10% of non-permanent revenues (e.g., oil-related income) from the General State Budget. These resources are allocated in two tranches:

- **Tranche A**: The baseline allocation corresponding to the transfers received by GADs in 2010.
- **Tranche B**: The surplus obtained after deducting Tranche A from the total pool of revenues.

For instance, in 2024 total transfers reached USD 2.998 billion, of which USD 2.136 billion corresponded to Tranche A and USD 863 million to Tranche B. This mechanism ensures that GADs never receive less than the 2010 baseline. Tranche B is distributed as follows: 27% to

[1] MET stands for Modelo de Equidad Territorial in Spanish

[2] COOTAD stands for Código Orgánico de Organización Territorial, Autonomía y Descentralización in Spanish

provincial GADs, 67% to municipal and metropolitan GADs, and 6% to rural parish GADs. Within each group, resources are allocated according to the MET, based on constitutional criteria that guarantee fairness.

These constitutional criteria are: population size, population density, unmet basic needs (UBN), improvements in living standards, fiscal effort, administrative effort, and goal compliance. The intuition behind including these criteria is that larger populations receive proportionally higher transfers, while low-density areas obtain greater per capita amounts to compensate for the higher cost of service provision. GADs with higher UBN levels are prioritized, and those showing reductions in poverty over the past three years are rewarded. Fiscal and administrative effort reflect the capacity to raise revenues and manage expenditures efficiently, while the goal compliance criterion incentivizes the achievement of local and national development objectives.

The following section outlines how these constitutional criteria interact to define the specific amount of transfers that each GAD receives.

A.1 Estimating the Amount Received by GAD i under Tranche B

The calculation of transfers under the MET relies not only on the allocation formula but also on a range of institutional data inputs. In practice, the Ministry of Economy and Finance (MEF) provides the budgetary allocations corresponding to Tranche A and the overall size of Tranche B. Demographic indicators such as population, unmet basic needs, and their historical values are produced by the National Institute of Statistics and Censuses (INEC). Information on fiscal effort, administrative effort, and goal compliance is compiled by the National Secretariat of Planning (SENPLADES/TSP). Finally, population projections and complementary macroeconomic data are provided by the Central Bank of Ecuador (BCE). This institutional architecture ensures that the MET operates on standardized and nationally validated information sources.

On this basis, it is is important to recall that Tranche A is already predetermined, as it corresponds to the baseline transfers received by GADs in 2010. Consequently, the seven

constitutional criteria are not applied to calculate Tranche A. Instead, these criteria are exclusively used to allocate the resources of Tranche B, which represents the surplus over the 2010 baseline. Next, we describe how the allocation for GAD i is determined under Tranche B.

The distribution of Tranche B across GADs is determined by the following formula:

$$R_i = \sum_{j=1}^{7} M_j \left(\frac{s_i^j P_i}{\sum_{i=1}^{n} s_i^j P_i} \right)$$

where:

- R_i is the amount in USD received by GAD i.
- M_j is the total amount allocated under criterion j.
- s_i^j is the dimensionless value associated with GAD i and criterion j.
- P_i is the weighted population of GAD i.

This formula shows that the allocation received by a GAD depends on three components: (i) the total amount assigned to each criterion (M_j), (ii) the weighted population term (P_i), and (iii) the adjustment factors associated with each criterion (s_i^j).

A.2 Estimating M_j

The first component in the allocation formula is M_j, which represents the total amount of Tranche B resources allocated to criterion j. The value of M_j depends on two elements:

- the total pool of resources available in Tranche B for a given level of government,
- the weighting coefficients assigned to each criterion, as established in Resolution No. 003-CNC-2019.

For instance, in 2024 the total amount of Tranche B allocated to municipal GADs was USD 544.32 million (67% of the total Tranche B). This pool was then distributed across the seven criteria according to their respective weights. Table A.1 shows how these weights translate into criterion-specific allocations. For example, the UBN criterion, with a weight

of 26, corresponds to USD 141.68 million, while the population criterion, with a weight of 10, corresponds to USD 54.49 million.

Thus, M_j reflects both the size of the overall Tranche B assigned to a given GAD level and the relative importance of each constitutional criterion in the distribution scheme.

Table A.1: Weighting Coefficients and Allocations by GAD Level

Criterion	Provincial	Municipal	Parish	Municipal USD
Population	10	10	15	54.49
Population Density	14	13	15	70.84
UBN	25	26	30	141.68
Improvement in Living Standards	25	25	25	136.23
Fiscal Effort	10	10	0	54.49
Administrative Effort	6	6	5	32.70
Goal Compliance	10	10	10	54.49
Amount per GAD Level	248.09	544.32	69.35	544.32

A.3 Estimating the Weighted Population P_i

The second component in the allocation formula is P_i, which represents the weighted population of GAD i. Unlike M_j, which is fixed by the resolution and the size of Tranche B, the value of P_i incorporates equity adjustments that account for demographic and geographic differences across territories. Specifically, the following adjustments are applied:

- **Rural population:** receives a 120% weight increase to promote equal opportunities relative to urban areas.
- **Border municipalities:** receive a 150% weighting factor to reflect their strategic role and the additional costs of providing services in border regions.
- **Galápagos GADs:** receive an adjustment based on the Consumer Price Index (CPI) relative to mainland Ecuador, recognizing their higher cost of living.

These adjustments ensure that the weighted population P_i not only reflects the size of the population but also incorporates territorial equity considerations. Once P_i is established,

it is combined with the criterion-specific adjustment factors s_i^j, which are described in the following subsection.

A.4 Estimating the Criterion-Specific Factors s_i^j

The third component in the allocation formula corresponds to the criterion-specific adjustment factors s_i^j. These factors operationalize the constitutional criteria and determine how much weight each GAD receives under each dimension of equity. In practice, s_i^j modifies the relative importance of a GAD's characteristics—such as population density, poverty levels, or fiscal effort—within the allocation of resources for criterion j.

While M_j sets the overall amount of money available under each criterion, and P_i establishes the demographic base for distribution, the s_i^j factors adjust the distribution to reflect the specific territorial and institutional conditions of each GAD. The following subsections describe how s_i^j is calculated for each of the seven constitutional criteria.

1. **Population Size Criterion**

   For this criterion $s_i^1 = 1$. This means that the allocation for this criterion is proportional to the total population of the GAD.

2. **Population Density Criterion** This criterion assigns more resources to GADs with lower population density, as service provision in dispersed areas is more expensive. The formula is:

$$s_i^2 = 1 + \log\left(\frac{\text{Max Density}}{\text{Density}_i}\right)$$

   where:

   - Max Density refers to the highest population density among municipal GADs.
   - Density_i is the population density of GAD i, defined as the ratio of population to territorial area.

   For the 2018 allocation, the $Density_i$ is calculated using data from 2016, that is, two years earlier. Specifically, the density for GAD_i is computed as the ratio of the total population in 2016 -urban population plus rural population -to the total territorial

area of the GAD. The maximum density (Max Density) is then determined across all GADs based on these 2016 values, and the ratio is used in the formula above.

3. **Unmet Basic Needs (UBN) Criterion** This criterion allocates more resources to GADs with higher poverty levels:

$$s_i^3 = \max\left(0.1^2, NBI^2\right)$$

This ensures that GADs with low UBN rates still receive a minimum allocation. For the 2018 allocation, the NBI is computed using the incidence of unmet basic needs observed in 2016.

4. **Improvement in Living Standards Criterion** This criterion incentivizes GADs to reduce poverty levels over the last three years. First, the poverty reduction rate in GAD i for year t is defined as:

$$\Delta NBI_{i,t} = 1 - \frac{NBI_{i,t}}{NBI_{i,t-1}}$$

where $\Delta NBI_{i,t}$ represents the proportion of people lifted out of poverty. Next, the three-year moving average is computed:

$$\overline{\Delta NBI}_{i,t-2} = \frac{1}{3}\sum_{h=2}^{4} \Delta NBI_{i,t-h}$$

Finally, the s_i value is modeled as a linear function of $\overline{\Delta NBI}$:

$$s_i^4 = \beta_0 + \beta_1 \overline{\Delta NBI}_{i,t-2}$$

where the coefficients β_0 and β_1 ensure that s_i remains between 1 and 5.

5. **Fiscal Effort Criterion**

According to the Eleventh Transitory Provision of the *Código Orgánico de Organización Territorial, Autonomía y Descentralización* (COOTAD), the fiscal effort variable is defined on the basis of an estimated own revenue for each local government i given by

$$IPPE_i = \beta_0 - \beta_1 NBI_i,$$

where

- $IPPE_i$ denotes the *estimated own revenue* of local government i.
- NBI_i is the poverty rate measured by unsatisfied basic needs in jurisdiction i, calculated as described in Criterion 3.[3]
- β_0 and β_1 are the coefficients of a linear regression of the logarithm of per capita own revenues on the poverty rate.

The residual of this regression is defined as

$$Res_i = Ing_i - IPPE_i,$$

where Ing_i is the logarithm of *actual per capita own revenue* for local government i, computed as the historical average of own revenues in years prior to the allocation year.[4]

The fiscal effort criterion is then given by

$$s_i^5 = Ing_i - IPPE_i - \min(Res),$$

where $\min(Res)$ denotes the minimum value of the regression residuals across all local governments.

6. **Administrative Effort Criterion** This criterion evaluates administrative efficiency over the past three years:

$$s_i^6 = \frac{\sum_{h=2}^{4} \text{Current Expenditure}_{t-h}}{\sum_{h=2}^{4} (\text{Own Revenue}_{t-h} + \text{Transfers}_{t-h})}$$

where:

- The numerator represents total administrative costs over the last three years.
- The denominator includes own-source revenue and transfers received over the same period.

[3]The construction of NBI_i follows the procedure outlined in the previous criterion, ensuring consistency across the allocation formula.

[4]This historical average ensures that the calculation of own revenues is not influenced by contemporaneous fluctuations at the time of allocation.

This criterion provides evidence that, for the 2018 allocation, the values are calculated using information from two years earlier, namely 2014, 2015, and 2016.

7. **Goal Compliance Criterion** This criterion rewards GADs that meet their development objectives. The Goal Compliance Index is calculated using three components:

   - Budget execution (A_j),
   - Physical execution (F_j),
   - Target achievement (CM_j).

   Each component is assigned a fixed weight (α, β, γ), and each goal has a prioritization weight (q_j). The formula is:

$$s_i^7 = \alpha \sum_{j=1}^{n} q_j A_j + \beta \sum_{j=1}^{n} q_j F_j + \gamma \sum_{j=1}^{n} q_j CM_j$$

   where $\alpha = 0.20$, $\beta = 0.30$, and $\gamma = 0.50$, reflecting the importance of each component in the evaluation. n represents the number of programs, projects, or goals for GAD i. A more detailed description of how A_j, F_j, and CM_j are calculated can be found in Consejo Nacional de Competencias (2017).

B Data Description

The empirical analysis relies on administrative data provided by two main institutions: the Ministry of Economy and Finance (MEF) and the Internal Revenue Service (SRI).

- **Government transfers and expenditures.** We use ministerial agreements issued by the Ministry of Economy and Finance for fiscal years 2016–2019 to identify the exact amounts transferred to each municipality. These agreements separately report baseline transfers (Tranche A) and formula-based transfers (Tranche B). All remaining transfers, excluding Tranches A and B, are aggregated into a single control variable.

  In addition, MEF provides detailed information on municipal expenditures, which correspond to spending carried out by the municipalities themselves. These include total

expenditure, current expenditure, investment expenditure, and their subcomponents (e.g., personnel, goods and services, capital transfers), reported annually for the period 2016–2019.

- **Allocation criteria.** The criteria underlying Tranche B—population, population density, unmet basic needs (NBI), improvements in NBI, fiscal effort, administrative effort, and goal compliance—are also computed and published by MEF. In our empirical specifications, we include these variables as controls under the label **MET Criteria**, obtained for the years 2016, 2017, and 2018.

- **Sales outcomes.** Data on local economic activity are sourced from the Internal Revenue Service (SRI), which reports municipal-level aggregates of sales based on firm-level tax declarations. We construct three outcome variables: **VAT-taxed Sales**, **Non-VAT Sales**, and **Total Sales**. These sales aggregates are reported for **all firms**, and the data also allow us to construct measures that exclude large firms. Accordingly, we build panels that cover both **all firms** and **small and medium enterprises (SMEs)** using the same definitions.

Ecuador's dataset comprises 221 municipalities (cantones), which constitute the full sample used in the analysis. In what follows, we provide a detailed description of the data sources and variables employed in the empirical study. Descriptive statistics for these variables are reported in

Table B.1: Descriptive statistics (Part 1)

Variable	Mean	Std. Dev.	Min	Max	Obs
Z_i	1.02	0.08	0.88	1.40	221
— Government Transfers (in USD MM) —					
Tranche B 2016	1.01	2.40	0.07	25.22	221
Tranche B 2017	1.60	4.13	0.10	43.79	221
Tranche B 2018	2.67	6.88	0.17	78.46	221
Tranche A	6.64	23.02	0.74	258.90	221
Other transfers (excl. A&B) 2016	3.77	21.88	0.00	319.76	218
Other transfers (excl. A&B) 2017	3.11	18.65	0.00	275.79	221
Other transfers (excl. A&B) 2018	2.48	16.22	0.00	241.04	221
— Sales Outcome (in USD MM) —					
VAT Sales 2016	432.23	3503.30	0.29	45171.47	221
VAT Sales 2017	465.32	3751.72	0.26	48373.71	221
VAT Sales 2018	492.24	3903.26	0.53	49875.89	221
VAT Sales 2019	490.23	3878.72	0.41	49450.93	221
Non-VAT Sales 2016	180.17	1018.10	0.15	12093.19	221
Non-VAT Sales 2017	192.22	1061.13	0.13	12524.28	221
Non-VAT Sales 2018	203.22	1097.19	0.16	12736.28	221
Non-VAT Sales 2019	219.88	1184.01	0.18	13622.69	221
Total Sales 2016	612.40	4511.85	0.62	57264.66	221
Total Sales 2017	657.54	4801.70	0.39	60897.99	221
Total Sales 2018	695.45	4987.76	0.78	62612.17	221
Total Sales 2019	710.11	5048.33	0.61	63073.62	221
VAT Sales SMEs 2016	281.47	2084.79	0.29	27298.06	221
VAT Sales SMEs 2017	296.35	2156.96	0.26	28035.04	221
VAT Sales SMEs 2018	310.85	2205.89	0.53	28303.54	221
VAT Sales SMEs 2019	310.43	2192.43	0.41	28052.02	221
Non-VAT Sales SMEs 2016	134.73	669.67	0.15	7961.27	221
Non-VAT Sales SMEs 2017	142.89	684.47	0.13	8136.84	221
Non-VAT Sales SMEs 2018	150.37	698.32	0.16	8143.89	221
Non-VAT Sales SMEs 2019	164.52	770.15	0.18	8956.04	221

Table B.2: Descriptive statistics (Part 2: Sales Outcomes, cont.)

Variable	Mean	Std. Dev.	Min	Max	Obs
— Sales Outcome (in USD MM), cont. —					
Total Sales SMEs 2016	416.20	2745.59	0.62	35259.33	221
Total Sales SMEs 2017	439.24	2832.87	0.39	36171.88	221
Total Sales SMEs 2018	461.21	2894.67	0.78	36447.43	221
Total Sales SMEs 2019	474.94	2952.77	0.61	37008.05	221
— Municipalities Expenditures (in USD MM) —					
Current Expenditure 2017	4.45	14.35	0.41	175.62	221
Investment Expenditure 2017	13.84	65.03	0.48	906.07	221
Total Expenditure 2017	18.29	78.83	1.21	1081.68	221
Current Expenditure 2018	4.49	12.53	0.44	134.34	221
Investment Expenditure 2018	16.12	81.28	0.73	1143.93	221
Total Expenditure 2018	20.61	92.59	1.46	1278.27	221
Current Expenditure 2019	4.60	12.95	0.44	137.44	221
Investment Expenditure 2019	13.51	51.58	1.11	599.17	221
— MET Criteria for Tranche B Calculation (2016) —					
Population 2014 ($\times$ 1000)	82.97	255.60	2.54	2643.92	221
Population Density 2015	9.60	2.65	1.00	18.39	221
NBI 2015	0.51	0.20	0.06	0.92	221
NBI Improvement 2015	3.28	0.67	1.00	5.00	221
Fiscal Effort 2015	0.07	0.06	0.00	0.66	221
Admin Effort 2015	3.77	1.15	1.37	9.42	221
Goal Compliance 2015	0.73	0.28	0.00	1.00	221

Table B.3: Descriptive statistics (Part 3: MET Criteria & following sections)

Variable	Mean	Std. Dev.	Min	Max	Obs
— MET Criteria for Tranche B Calculation (2017) —					
Population 2015 (× 1000)	84.32	259.47	2.65	2692.69	221
Population Density 2016	9.60	2.65	1.00	18.39	221
NBI 2016	0.51	0.20	0.06	0.92	221
NBI Improvement 2016	3.28	0.67	1.00	5.00	221
Fiscal Effort 2016	0.07	0.06	0.00	0.66	221
Admin Effort 2016	3.77	1.15	1.37	9.42	221
Goal Compliance 2016	0.73	0.28	0.00	1.00	221
— MET Criteria for Tranche B Calculation (2018) —					
Population 2016 (× 1000)	83.80	262.84	2.54	2741.11	221
Population Density 2017	5.54	1.40	1.00	10.23	221
NBI 2017	0.50	0.21	0.05	0.99	221
NBI Improvement 2017	3.30	0.67	1.00	5.00	221
Fiscal Effort 2017	0.13	0.09	0.02	0.62	221
Admin Effort 2017	3.53	1.10	1.50	9.27	221
Goal Compliance 2017	0.77	0.22	0.17	1.00	221

C Further results

To complement the main results presented in Table 4 of the main manuscript, Appendix Section B provides an expanded set of instrumental variables estimates. Tables C.1 to C.12 disaggregate the results by outcome type (VAT-taxed, non-VAT, and total sales), year (2018 and 2019), and firm size (all firms vs. SMEs), while also showing robustness to alternative sets of controls. These additional tables document in detail the consistency of the findings reported in the main text and allow readers to assess how sensitive the estimated elasticities are to different covariate specifications and sample definitions. In addition, Table C.13 reports further falsification tests using municipal total, current, and investment expenditures for 2017, as well as population in 2018, including the tF-adjusted confidence intervals for small-sample and weak-instrument concerns. Table C.14 presents the 2SLS-DID specification discussed in the main manuscript.

Table C.1: IV estimates for VAT-taxed Sales (2018, all firms)

	Model (1)	Model (2)	Model (3)	Model (4)
log(Tranche B)	1.269***	1.168***	0.867***	0.813***
	(0.289)	(0.212)	(0.330)	(0.311)
Controls				
MET Criteria	Yes	Yes	Yes	Yes
Province FE	Not	Yes	Yes	Yes
Other Transfers	Not	Not	Yes	Yes
Lag Dep. Vars	Not	Not	Not	Yes
95% tF-adjusted C.I.				
Lower bound	0.703	0.753	0.220	0.202
Upper bound	1.835	1.583	1.513	1.423
Observations	221	221	221	221

Note: This table reports IV estimates where the endogenous regressor is the log of Tranche B in 2018, instrumented with the recentered instrument $\tilde{Z}$. All regressions include the specified control variables: **MET criteria** correspond to the seven pre-reform allocation criteria defined in the transfer formula. **Province fixed effects** control for time-invariant provincial characteristics. **Other Transfers** includes log of Tranche A and other transfers (excluding Tranches A and B). **Lagged dependent variables** include 2017 outcomes, ensuring that results are not driven by pre-reform dynamics. Standard errors reported in parentheses are adjusted following the tF-procedure of Lee et al. (2022). The lower and upper bounds at the bottom correspond to the tF-adjusted 95% confidence interval for the coefficient on $\log(\text{Tranche B})_{2018}$. Significance levels: $^{*}p < 0.10$, $^{**}p < 0.05$, $^{**}p < 0.01$.

Table C.2: IV estimates for Non-VAT Sales (2018, all firms)

	Model (1)	Model (2)	Model (3)	Model (4)
log(Tranche B)	1.181***	1.235***	1.123**	1.096**
	(0.388)	(0.316)	(0.555)	(0.536)
Controls				
MET Criteria	Yes	Yes	Yes	Yes
Province FE	Not	Yes	Yes	Yes
Other Transfers	Not	Not	Yes	Yes
Lag Dep. Vars	Not	Not	Not	Yes
95% tF-adjusted C.I.				
Lower bound	0.420	0.616	0.035	0.045
Upper bound	1.942	1.853	2.210	2.147
Observations	221	221	221	221

Note: This table reports IV estimates where the endogenous regressor is the log of Tranche B in 2018, instrumented with the recentered instrument $\tilde{Z}$. All regressions include the specified control variables: **MET criteria** correspond to the seven pre-reform allocation criteria defined in the transfer formula. **Province fixed effects** control for time-invariant provincial characteristics. **Other Transfers** includes log of Tranche A and other transfers (excluding Tranches A and B). **Lagged dependent variables** include 2017 outcomes, ensuring that results are not driven by pre-reform dynamics. Standard errors reported in parentheses are adjusted following the tF-procedure of Lee et al. (2022). The lower and upper bounds at the bottom correspond to the tF-adjusted 95% confidence interval for the coefficient on $\log(\text{Tranche B})_{2018}$. Significance levels: $^{*}p < 0.10$, $^{**}p < 0.05$, $^{**}p < 0.01$.

Table C.3: IV estimates for Total Sales (2018, all firms)

	Model (1)	Model (2)	Model (3)	Model (4)
log(Tranche B)	1.210***	1.167***	0.935**	0.896**
	(0.293)	(0.222)	(0.377)	(0.364)
Controls				
MET Criteria	Yes	Yes	Yes	Yes
Province FE	Not	Yes	Yes	Yes
Other Transfers	Not	Not	Yes	Yes
Lag Dep. Vars	Not	Not	Not	Yes
95% tF-adjusted C.I.				
Lower bound	0.635	0.732	0.196	0.182
Upper bound	1.785	1.602	1.674	1.610
Observations	221	221	221	221

Note: This table reports IV estimates where the endogenous regressor is the log of Tranche B in 2018, instrumented with the recentered instrument $\tilde{Z}$. All regressions include the specified control variables: **MET criteria** correspond to the seven pre-reform allocation criteria defined in the transfer formula. **Province fixed effects** control for time-invariant provincial characteristics. **Other Transfers** includes log of Tranche A and other transfers (excluding Tranches A and B). **Lagged dependent variables** include 2017 outcomes, ensuring that results are not driven by pre-reform dynamics. Standard errors reported in parentheses are adjusted following the tF-procedure of Lee et al. (2022). The lower and upper bounds at the bottom correspond to the tF-adjusted 95% confidence interval for the coefficient on $\log(\text{Tranche B})_{2018}$. Significance levels: $^{*}p < 0.10$, $^{**}p < 0.05$, $^{**}p < 0.01$.

Table C.4: IV estimates for VAT-Taxed Sales (2019, all firms)

	Model (1)	Model (2)	Model (3)	Model (4)
log(Tranche B)	1.287***	1.180***	0.920***	0.867***
	(0.290)	(0.224)	(0.350)	(0.329)
Controls				
MET Criteria	Yes	Yes	Yes	Yes
Province FE	Not	Yes	Yes	Yes
Other Transfers	Not	Not	Yes	Yes
Lag Dep. Vars	Not	Not	Not	Yes
95% tF-adjusted C.I.				
Lower bound	0.718	0.741	0.235	0.222
Upper bound	1.856	1.618	1.606	1.512
Observations	221	221	221	221

Note: This table reports IV estimates where the endogenous regressor is the log of Tranche B in 2018, instrumented with the recentered instrument $\tilde{Z}$. All regressions include the specified control variables: **MET criteria** correspond to the seven pre-reform allocation criteria defined in the transfer formula. **Province fixed effects** control for time-invariant provincial characteristics. **Other Transfers** includes log of Tranche A and other transfers (excluding Tranches A and B). **Lagged dependent variables** include 2017 outcomes, ensuring that results are not driven by pre-reform dynamics. Standard errors reported in parentheses are adjusted following the tF-procedure of Lee et al. (2022). The lower and upper bounds at the bottom correspond to the tF-adjusted 95% confidence interval for the coefficient on $\log(\text{Tranche B})_{2018}$. Significance levels: $^{*}p < 0.10$, $^{**}p < 0.05$, $^{**}p < 0.01$.

Table C.5: IV estimates for Non-VAT Sales (2019, all firms)

	Model (1)	Model (2)	Model (3)	Model (4)
log(Tranche B)	1.273***	1.329***	1.330**	1.290**
	(0.393)	(0.321)	(0.582)	(0.561)
Controls				
MET Criteria	Yes	Yes	Yes	Yes
Province FE	Not	Yes	Yes	Yes
Other Transfers	Not	Not	Yes	Yes
Lag Dep. Vars	Not	Not	Not	Yes
95% tF-adjusted C.I.				
Lower bound	0.502	0.700	0.189	0.191
Upper bound	2.044	1.958	2.472	2.389
Observations	221	221	221	221

Note: This table reports IV estimates where the endogenous regressor is the log of Tranche B in 2018, instrumented with the recentered instrument $\tilde{Z}$. All regressions include the specified control variables: **MET criteria** correspond to the seven pre-reform allocation criteria defined in the transfer formula. **Province fixed effects** control for time-invariant provincial characteristics. **Other Transfers** includes log of Tranche A and other transfers (excluding Tranches A and B). **Lagged dependent variables** include 2017 outcomes, ensuring that results are not driven by pre-reform dynamics. Standard errors reported in parentheses are adjusted following the tF-procedure of Lee et al. (2022). The lower and upper bounds at the bottom correspond to the tF-adjusted 95% confidence interval for the coefficient on $\log(\text{Tranche B})_{2018}$. Significance levels: $^{*}p < 0.10$, $^{**}p < 0.05$, $^{**}p < 0.01$.

Table C.6: IV estimates for Total Sales (2019, all firms)

	Model (1)	Model (2)	Model (3)	Model (4)
log(Tranche B)	1.258***	1.216***	1.049***	1.006***
	(0.295)	(0.230)	(0.402)	(0.387)
Controls				
MET Criteria	Yes	Yes	Yes	Yes
Province FE	Not	Yes	Yes	Yes
Other Transfers	Not	Not	Yes	Yes
Lag Dep. Vars	Not	Not	Not	Yes
95% tF-adjusted C.I.				
Lower bound	0.680	0.766	0.262	0.248
Upper bound	1.836	1.666	1.837	1.764
Observations	221	221	221	221

Note: This table reports IV estimates where the endogenous regressor is the log of Tranche B in 2018, instrumented with the recentered instrument $\tilde{Z}$. All regressions include the specified control variables: **MET criteria** correspond to the seven pre-reform allocation criteria defined in the transfer formula. **Province fixed effects** control for time-invariant provincial characteristics. **Other Transfers** includes log of Tranche A and other transfers (excluding Tranches A and B). **Lagged dependent variables** include 2017 outcomes, ensuring that results are not driven by pre-reform dynamics. Standard errors reported in parentheses are adjusted following the tF-procedure of Lee et al. (2022). The lower and upper bounds at the bottom correspond to the tF-adjusted 95% confidence interval for the coefficient on $\log(\text{Tranche B})_{2018}$. Significance levels: $^{*}p < 0.10$, $^{**}p < 0.05$, $^{**}p < 0.01$.

Table C.7: IV estimates for VAT-Taxed Sales (2018, small and medium enterprises)

	Model (1)	Model (2)	Model (3)	Model (4)
log(Tranche B)	1.226***	1.163***	0.898***	0.862***
	(0.241)	(0.211)	(0.316)	(0.301)
Controls				
MET Criteria	Yes	Yes	Yes	Yes
Province FE	Not	Yes	Yes	Yes
Other Transfers	Not	Not	Yes	Yes
Lag Dep. Vars	Not	Not	Not	Yes
95% tF-adjusted C.I.				
Lower bound	0.754	0.749	0.279	0.272
Upper bound	1.698	1.578	1.517	1.451
Observations	221	221	221	221

Note: This table reports IV estimates where the endogenous regressor is the log of Tranche B in 2018, instrumented with the recentered instrument $\tilde{Z}$. All regressions include the specified control variables: **MET criteria** correspond to the seven pre-reform allocation criteria defined in the transfer formula. **Province fixed effects** control for time-invariant provincial characteristics. **Other Transfers** includes log of Tranche A and other transfers (excluding Tranches A and B). **Lagged dependent variables** include 2017 outcomes, ensuring that results are not driven by pre-reform dynamics. Standard errors reported in parentheses are adjusted following the tF-procedure of Lee et al. (2022). The lower and upper bounds at the bottom correspond to the tF-adjusted 95% confidence interval for the coefficient on $\log(\text{Tranche B})_{2018}$. Significance levels: $^{*}p < 0.10$, $^{**}p < 0.05$, $^{**}p < 0.01$.

Table C.8: IV estimates for Non-VAT Sales (2018, small and medium enterprises)

	Model (1)	Model (2)	Model (3)	Model (4)
log(Tranche B)	1.153***	1.224***	1.080**	1.085**
	(0.375)	(0.311)	(0.550)	(0.527)
Controls				
MET Criteria	Yes	Yes	Yes	Yes
Province FE	Not	Yes	Yes	Yes
Other Transfers	Not	Not	Yes	Yes
Lag Dep. Vars	Not	Not	Not	Yes
95% tF-adjusted C.I.				
Lower bound	0.418	0.616	0.003	0.051
Upper bound	1.887	1.833	2.157	2.119
Observations	221	221	221	221

Note: This table reports IV estimates where the endogenous regressor is the log of Tranche B in 2018, instrumented with the recentered instrument $\tilde{Z}$. All regressions include the specified control variables: **MET criteria** correspond to the seven pre-reform allocation criteria defined in the transfer formula. **Province fixed effects** control for time-invariant provincial characteristics. **Other Transfers** includes log of Tranche A and other transfers (excluding Tranches A and B). **Lagged dependent variables** include 2017 outcomes, ensuring that results are not driven by pre-reform dynamics. Standard errors reported in parentheses are adjusted following the tF-procedure of Lee et al. (2022). The lower and upper bounds at the bottom correspond to the tF-adjusted 95% confidence interval for the coefficient on $\log(\text{Tranche B})_{2018}$. Significance levels: $^{*}p < 0.10$, $^{**}p < 0.05$, $^{**}p < 0.01$.

Table C.9: IV estimates for Total Sales (2018, small and medium enterprises)

	Model (1)	Model (2)	Model (3)	Model (4)
log(Tranche B)	1.183***	1.168***	0.948***	0.934***
	(0.247)	(0.211)	(0.356)	(0.343)
Controls				
MET Criteria	Yes	Yes	Yes	Yes
Province FE	Not	Yes	Yes	Yes
Other Transfers	Not	Not	Yes	Yes
Lag Dep. Vars	Not	Not	Not	Yes
95% tF-adjusted C.I.				
Lower bound	0.698	0.754	0.251	0.262
Upper bound	1.667	1.581	1.645	1.606
Observations	221	221	221	221

Note: This table reports IV estimates where the endogenous regressor is the log of Tranche B in 2018, instrumented with the recentered instrument $\tilde{Z}$. All regressions include the specified control variables: **MET criteria** correspond to the seven pre-reform allocation criteria defined in the transfer formula. **Province fixed effects** control for time-invariant provincial characteristics. **Other Transfers** includes log of Tranche A and other transfers (excluding Tranches A and B). **Lagged dependent variables** include 2017 outcomes, ensuring that results are not driven by pre-reform dynamics. Standard errors reported in parentheses are adjusted following the tF-procedure of Lee et al. (2022). The lower and upper bounds at the bottom correspond to the tF-adjusted 95% confidence interval for the coefficient on $\log(\text{Tranche B})_{2018}$. Significance levels: $^{*}p < 0.10$, $^{**}p < 0.05$, $^{**}p < 0.01$.

Table C.10: IV estimates for VAT-Taxed Sales (2019, small and medium enterprises)

	Model (1)	Model (2)	Model (3)	Model (4)
log(Tranche B)	1.241***	1.172***	0.944***	0.907***
	(0.245)	(0.226)	(0.350)	(0.332)
Controls				
MET Criteria	Yes	Yes	Yes	Yes
Province FE	Not	Yes	Yes	Yes
Other Transfers	Not	Not	Yes	Yes
Lag Dep. Vars	Not	Not	Not	Yes
95% tF-adjusted C.I.				
Lower bound	0.761	0.730	0.258	0.257
Upper bound	1.722	1.614	1.630	1.557
Observations	221	221	221	221

Note: This table reports IV estimates where the endogenous regressor is the log of Tranche B in 2018, instrumented with the recentered instrument $\tilde{Z}$. All regressions include the specified control variables: **MET criteria** correspond to the seven pre-reform allocation criteria defined in the transfer formula. **Province fixed effects** control for time-invariant provincial characteristics. **Other Transfers** includes log of Tranche A and other transfers (excluding Tranches A and B). **Lagged dependent variables** include 2017 outcomes, ensuring that results are not driven by pre-reform dynamics. Standard errors reported in parentheses are adjusted following the tF-procedure of Lee et al. (2022). The lower and upper bounds at the bottom correspond to the tF-adjusted 95% confidence interval for the coefficient on $\log(\text{Tranche B})_{2018}$. Significance levels: $^{*}p < 0.10$, $^{**}p < 0.05$, $^{**}p < 0.01$.

Table C.11: IV estimates for Non-VAT Sales (2019, small and medium enterprises)

	Model (1)	Model (2)	Model (3)	Model (4)
log(Tranche B)	1.246***	1.323***	1.301**	1.291**
	(0.384)	(0.318)	(0.580)	(0.556)
Controls				
MET Criteria	Yes	Yes	Yes	Yes
Province FE	Not	Yes	Yes	Yes
Other Transfers	Not	Not	Yes	Yes
Lag Dep. Vars	Not	Not	Not	Yes
95% tF-adjusted C.I.				
Lower bound	0.494	0.699	0.164	0.201
Upper bound	1.998	1.947	2.438	2.381
Observations	221	221	221	221

Note: This table reports IV estimates where the endogenous regressor is the log of Tranche B in 2018, instrumented with the recentered instrument $\tilde{Z}$. All regressions include the specified control variables: **MET criteria** correspond to the seven pre-reform allocation criteria defined in the transfer formula. **Province fixed effects** control for time-invariant provincial characteristics. **Other Transfers** includes log of Tranche A and other transfers (excluding Tranches A and B). **Lagged dependent variables** include 2017 outcomes, ensuring that results are not driven by pre-reform dynamics. Standard errors reported in parentheses are adjusted following the tF-procedure of Lee et al. (2022). The lower and upper bounds at the bottom correspond to the tF-adjusted 95% confidence interval for the coefficient on $\log(\text{Tranche B})_{2018}$. Significance levels: $^{*}p < 0.10$, $^{**}p < 0.05$, $^{**}p < 0.01$.

Table C.12: IV estimates for Non-VAT Sales (2019, small and medium enterprises)

	Model (1)	Model (2)	Model (3)	Model (4)
log(Tranche B)	1.230***	1.218***	1.064***	1.045***
	(0.254)	(0.222)	(0.390)	(0.375)
Controls				
MET Criteria	Yes	Yes	Yes	Yes
Province FE	Not	Yes	Yes	Yes
Other Transfers	Not	Not	Yes	Yes
Lag Dep. Vars	Not	Not	Not	Yes
95% tF-adjusted C.I.				
Lower bound	0.732	0.783	0.300	0.310
Upper bound	1.727	1.652	1.829	1.780
Observations	221	221	221	221

Note: This table reports IV estimates where the endogenous regressor is the log of Tranche B in 2018, instrumented with the recentered instrument $\tilde{Z}$. All regressions include the specified control variables: **MET criteria** correspond to the seven pre-reform allocation criteria defined in the transfer formula. **Province fixed effects** control for time-invariant provincial characteristics. **Other Transfers** includes log of Tranche A and other transfers (excluding Tranches A and B). **Lagged dependent variables** include 2017 outcomes, ensuring that results are not driven by pre-reform dynamics. Standard errors reported in parentheses are adjusted following the tF-procedure of Lee et al. (2022). The lower and upper bounds at the bottom correspond to the tF-adjusted 95% confidence interval for the coefficient on $\log(\text{Tranche B})_{2018}$. Significance levels: $^{*}p < 0.10$, $^{**}p < 0.05$, $^{**}p < 0.01$.

Table C.13: Falsification tests: Placebo outcomes unaffected by the transfer in 2018 (for SMEs)

Outcome Variable	Coef.	Std. Err.	95% CI (L)	95% CI (U)	Obs.
Total Exp. (2017)	0.597	0.268	-0.372	1.566	221
Current Exp. (2017)	-0.052	0.381	-1.432	1.328	221
Invest. Exp. (2017)	0.811	0.400	-0.638	2.261	221
Population (2018)	603.126	299.720	-229.532	1435.785	221

Note: This table reports IV estimates where the endogenous regressor is the log of Tranche B in t, instrumented with the recentered instrument $\tilde{Z}$. The regressor is aligned with the timing of each placebo outcome (e.g., log(Tranche B) in 2016 for 2016 outcomes). Coefficients are obtained from 2SLS regressions for different outcome variables. Both standard errors and 95% confidence intervals are tF-adjusted following Lee et al. (2022). All specifications include the same set of controls as in the main results, corresponding to the year of each placebo outcome Significance levels: $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table C.14: Effects of Transfers on Sales (2SLS-DID)

Panel A: All firms

	(1) VAT Taxed Sales	(2) Non-VAT Sales	(3) Total Sales
	1.260***	1.291***	1.292***
	(0.140)	(0.235)	(0.163)
Panel B: SMEs			
	1.299***	1.280***	1.300***
	(0.130)	(0.231)	(0.154)
Observations	847	847	847

Notes: 2SLS-DID estimates. The endogenous variable is log(Tranche B). The instrument is the interaction between $\tilde{Z}_i$ and and indicator of post-reform. Please see Section 3.2 of the manuscript for details. Specifications include year fixed effects and controls interacted with the post-reform indicator. Standard errors clustered at the municipality level. Significance levels: $^{*}p < 0.10$, $^{**}p < 0.05$, $^{**}p < 0.01$.

D Further results with Z_i

To complement the results presented in Appendix C, Appendix Section D provides an additional set of instrumental variables estimates. Tables D.1 to D.12 disaggregate the results by outcome type (VAT-taxed, non-VAT, and total sales), year (2018 and 2019), and firm size (all firms vs. SMEs), while also showing robustness to alternative sets of controls. These results are broadly consistent with those reported in Appendix C; however, instead of using the recentered instrument $\tilde{Z}$, the estimates in this section rely directly on the original instrument Z. This alternative specification allows readers to assess the sensitivity of the findings to the choice of instrument and confirms that the main conclusions remain robust across different instrument definitions.

Table D.1: IV estimates for VAT-taxed Sales (2018, all firms)

	Model (1)	Model (2)	Model (3)	Model (4)
log(Tranche B)	1.269***	1.168***	0.867***	0.813***
	(0.289)	(0.212)	(0.330)	(0.311)
Controls				
MET Criteria	Yes	Yes	Yes	Yes
Province FE	Not	Yes	Yes	Yes
Other Transfers	Not	Not	Yes	Yes
Lag Dep. Vars	Not	Not	Not	Yes
95% tF-adjusted C.I.				
Lower bound	0.703	0.753	0.220	0.202
Upper bound	1.835	1.583	1.513	1.423
Observations	221	221	221	221

Note: This table reports IV estimates where the endogenous regressor is the log of Tranche B in 2018, instrumented with the instrument Z. All regressions include the specified control variables: **MET criteria** correspond to the seven pre-reform allocation criteria defined in the transfer formula. **Province fixed effects** control for time-invariant provincial characteristics. **Other Transfers** includes log of Tranche A and other transfers (excluding Tranches A and B). **Lagged dependent variables** include 2017 outcomes, ensuring that results are not driven by pre-reform dynamics. Standard errors reported in parentheses are adjusted following the tF-procedure of Lee et al. (2022). The lower and upper bounds at the bottom correspond to the tF-adjusted 95% confidence interval for the coefficient on $\log(\text{Tranche B})_{2018}$. Significance levels: $^{*}p < 0.10$, $^{**}p < 0.05$, $^{**}p < 0.01$.

Table D.2: IV estimates for Non-VAT Sales (2018, all firms)

	Model (1)	Model (2)	Model (3)	Model (4)
log(Tranche B)	1.181***	1.235***	1.123**	1.096**
	(0.388)	(0.316)	(0.555)	(0.536)
Controls				
MET Criteria	Yes	Yes	Yes	Yes
Province FE	Not	Yes	Yes	Yes
Other Transfers	Not	Not	Yes	Yes
Lag Dep. Vars	Not	Not	Not	Yes
95% tF-adjusted C.I.				
Lower bound	0.420	0.616	0.035	0.045
Upper bound	1.942	1.853	2.210	2.147
Observations	221	221	221	221

Note: This table reports IV estimates where the endogenous regressor is the log of Tranche B in 2018, instrumented with the instrument Z. All regressions include the specified control variables: **MET criteria** correspond to the seven pre-reform allocation criteria defined in the transfer formula. **Province fixed effects** control for time-invariant provincial characteristics. **Other Transfers** includes log of Tranche A and other transfers (excluding Tranches A and B). **Lagged dependent variables** include 2017 outcomes, ensuring that results are not driven by pre-reform dynamics. Standard errors reported in parentheses are adjusted following the tF-procedure of Lee et al. (2022). The lower and upper bounds at the bottom correspond to the tF-adjusted 95% confidence interval for the coefficient on $\log(\text{Tranche B})_{2018}$. Significance levels: $^{*}p < 0.10$, $^{**}p < 0.05$, $^{**}p < 0.01$.

Table D.3: IV estimates for Total Sales (2018, all firms)

	Model (1)	Model (2)	Model (3)	Model (4)
log(Tranche B)	1.210***	1.167***	0.935**	0.896**
	(0.293)	(0.222)	(0.377)	(0.364)
Controls				
MET Criteria	Yes	Yes	Yes	Yes
Province FE	Not	Yes	Yes	Yes
Other Transfers	Not	Not	Yes	Yes
Lag Dep. Vars	Not	Not	Not	Yes
95% tF-adjusted C.I.				
Lower bound	0.635	0.732	0.196	0.182
Upper bound	1.785	1.602	1.674	1.610
Observations	221	221	221	221

Note: This table reports IV estimates where the endogenous regressor is the log of Tranche B in 2018, instrumented with the instrument Z. All regressions include the specified control variables: **MET criteria** correspond to the seven pre-reform allocation criteria defined in the transfer formula. **Province fixed effects** control for time-invariant provincial characteristics. **Other Transfers** includes log of Tranche A and other transfers (excluding Tranches A and B). **Lagged dependent variables** include 2017 outcomes, ensuring that results are not driven by pre-reform dynamics. Standard errors reported in parentheses are adjusted following the tF-procedure of Lee et al. (2022). The lower and upper bounds at the bottom correspond to the tF-adjusted 95% confidence interval for the coefficient on $\log(\text{Tranche B})_{2018}$. Significance levels: $^{*}p < 0.10$, $^{**}p < 0.05$, $^{**}p < 0.01$.

Table D.4: IV estimates for VAT-Taxed Sales (2019, all firms)

	Model (1)	Model (2)	Model (3)	Model (4)
log(Tranche B)	1.287***	1.180***	0.920***	0.867***
	(0.290)	(0.224)	(0.350)	(0.329)
Controls				
MET Criteria	Yes	Yes	Yes	Yes
Province FE	Not	Yes	Yes	Yes
Other Transfers	Not	Not	Yes	Yes
Lag Dep. Vars	Not	Not	Not	Yes
95% tF-adjusted C.I.				
Lower bound	0.718	0.741	0.235	0.222
Upper bound	1.856	1.618	1.606	1.512
Observations	221	221	221	221

Note: This table reports IV estimates where the endogenous regressor is the log of Tranche B in 2018, instrumented with the instrument Z. All regressions include the specified control variables: **MET criteria** correspond to the seven pre-reform allocation criteria defined in the transfer formula. **Province fixed effects** control for time-invariant provincial characteristics. **Other Transfers** includes log of Tranche A and other transfers (excluding Tranches A and B). **Lagged dependent variables** include 2017 outcomes, ensuring that results are not driven by pre-reform dynamics. Standard errors reported in parentheses are adjusted following the tF-procedure of Lee et al. (2022). The lower and upper bounds at the bottom correspond to the tF-adjusted 95% confidence interval for the coefficient on $\log(\text{Tranche B})_{2018}$. Significance levels: $^{*}p < 0.10$, $^{**}p < 0.05$, $^{**}p < 0.01$.

Table D.5: IV estimates for Non-VAT Sales (2019, all firms)

	Model (1)	Model (2)	Model (3)	Model (4)
log(Tranche B)	1.273***	1.329***	1.330**	1.290**
	(0.393)	(0.321)	(0.582)	(0.561)
Controls				
MET Criteria	Yes	Yes	Yes	Yes
Province FE	Not	Yes	Yes	Yes
Other Transfers	Not	Not	Yes	Yes
Lag Dep. Vars	Not	Not	Not	Yes
95% tF-adjusted C.I.				
Lower bound	0.502	0.700	0.189	0.191
Upper bound	2.044	1.958	2.472	2.389
Observations	221	221	221	221

Note: This table reports IV estimates where the endogenous regressor is the log of Tranche B in 2018, instrumented with the instrument Z. All regressions include the specified control variables: **MET criteria** correspond to the seven pre-reform allocation criteria defined in the transfer formula. **Province fixed effects** control for time-invariant provincial characteristics. **Other Transfers** includes log of Tranche A and other transfers (excluding Tranches A and B). **Lagged dependent variables** include 2017 outcomes, ensuring that results are not driven by pre-reform dynamics. Standard errors reported in parentheses are adjusted following the tF-procedure of Lee et al. (2022). The lower and upper bounds at the bottom correspond to the tF-adjusted 95% confidence interval for the coefficient on $\log(\text{Tranche B})_{2018}$. Significance levels: $^{*}p < 0.10$, $^{**}p < 0.05$, $^{**}p < 0.01$.

Table D.6: IV estimates for Total Sales (2019, all firms)

	Model (1)	Model (2)	Model (3)	Model (4)
log(Tranche B)	1.258***	1.216***	1.049***	1.006***
	(0.295)	(0.230)	(0.402)	(0.387)
Controls				
MET Criteria	Yes	Yes	Yes	Yes
Province FE	Not	Yes	Yes	Yes
Other Transfers	Not	Not	Yes	Yes
Lag Dep. Vars	Not	Not	Not	Yes
95% tF-adjusted C.I.				
Lower bound	0.680	0.766	0.262	0.248
Upper bound	1.836	1.666	1.837	1.764
Observations	221	221	221	221

Note: This table reports IV estimates where the endogenous regressor is the log of Tranche B in 2018, instrumented with the instrument Z. All regressions include the specified control variables: **MET criteria** correspond to the seven pre-reform allocation criteria defined in the transfer formula. **Province fixed effects** control for time-invariant provincial characteristics. **Other Transfers** includes log of Tranche A and other transfers (excluding Tranches A and B). **Lagged dependent variables** include 2017 outcomes, ensuring that results are not driven by pre-reform dynamics. Standard errors reported in parentheses are adjusted following the tF-procedure of Lee et al. (2022). The lower and upper bounds at the bottom correspond to the tF-adjusted 95% confidence interval for the coefficient on $\log(\text{Tranche B})_{2018}$. Significance levels: $^{*}p < 0.10$, $^{**}p < 0.05$, $^{**}p < 0.01$.

Table D.7: IV estimates for VAT-Taxed Sales (2018, small and medium enterprises)

	Model (1)	Model (2)	Model (3)	Model (4)
log(Tranche B)	1.226***	1.163***	0.898***	0.862***
	(0.241)	(0.211)	(0.316)	(0.301)
Controls				
MET Criteria	Yes	Yes	Yes	Yes
Province FE	Not	Yes	Yes	Yes
Other Transfers	Not	Not	Yes	Yes
Lag Dep. Vars	Not	Not	Not	Yes
95% tF-adjusted C.I.				
Lower bound	0.754	0.749	0.279	0.272
Upper bound	1.698	1.578	1.517	1.451
Observations	221	221	221	221

Note: This table reports IV estimates where the endogenous regressor is the log of Tranche B in 2018, instrumented with the instrument Z. All regressions include the specified control variables: **MET criteria** correspond to the seven pre-reform allocation criteria defined in the transfer formula. **Province fixed effects** control for time-invariant provincial characteristics. **Other Transfers** includes log of Tranche A and other transfers (excluding Tranches A and B). **Lagged dependent variables** include 2017 outcomes, ensuring that results are not driven by pre-reform dynamics. Standard errors reported in parentheses are adjusted following the tF-procedure of Lee et al. (2022). The lower and upper bounds at the bottom correspond to the tF-adjusted 95% confidence interval for the coefficient on $\log(\text{Tranche B})_{2018}$. Significance levels: $^{*}p < 0.10$, $^{**}p < 0.05$, $^{**}p < 0.01$.

Table D.8: IV estimates for Non-VAT Sales (2018, small and medium enterprises)

	Model (1)	Model (2)	Model (3)	Model (4)
log(Tranche B)	1.153***	1.224***	1.080**	1.085**
	(0.375)	(0.311)	(0.550)	(0.527)
Controls				
MET Criteria	Yes	Yes	Yes	Yes
Province FE	Not	Yes	Yes	Yes
Other Transfers	Not	Not	Yes	Yes
Lag Dep. Vars	Not	Not	Not	Yes
95% tF-adjusted C.I.				
Lower bound	0.418	0.616	0.003	0.051
Upper bound	1.887	1.833	2.157	2.119
Observations	221	221	221	221

Note: This table reports IV estimates where the endogenous regressor is the log of Tranche B in 2018, instrumented with the instrument Z. All regressions include the specified control variables: **MET criteria** correspond to the seven pre-reform allocation criteria defined in the transfer formula. **Province fixed effects** control for time-invariant provincial characteristics. **Other Transfers** includes log of Tranche A and other transfers (excluding Tranches A and B). **Lagged dependent variables** include 2017 outcomes, ensuring that results are not driven by pre-reform dynamics. Standard errors reported in parentheses are adjusted following the tF-procedure of Lee et al. (2022). The lower and upper bounds at the bottom correspond to the tF-adjusted 95% confidence interval for the coefficient on $\log(\text{Tranche B})_{2018}$. Significance levels: $^{*}p < 0.10$, $^{**}p < 0.05$, $^{**}p < 0.01$.

Table D.9: IV estimates for Total Sales (2018, small and medium enterprises)

	Model (1)	Model (2)	Model (3)	Model (4)
log(Tranche B)	1.183***	1.168***	0.948***	0.934***
	(0.247)	(0.211)	(0.356)	(0.343)
Controls				
MET Criteria	Yes	Yes	Yes	Yes
Province FE	Not	Yes	Yes	Yes
Other Transfers	Not	Not	Yes	Yes
Lag Dep. Vars	Not	Not	Not	Yes
95% tF-adjusted C.I.				
Lower bound	0.698	0.754	0.251	0.262
Upper bound	1.667	1.581	1.645	1.606
Observations	221	221	221	221

Note: This table reports IV estimates where the endogenous regressor is the log of Tranche B in 2018, instrumented with the instrument Z. All regressions include the specified control variables: **MET criteria** correspond to the seven pre-reform allocation criteria defined in the transfer formula. **Province fixed effects** control for time-invariant provincial characteristics. **Other Transfers** includes log of Tranche A and other transfers (excluding Tranches A and B). **Lagged dependent variables** include 2017 outcomes, ensuring that results are not driven by pre-reform dynamics. Standard errors reported in parentheses are adjusted following the tF-procedure of Lee et al. (2022). The lower and upper bounds at the bottom correspond to the tF-adjusted 95% confidence interval for the coefficient on $\log(\text{Tranche B})_{2018}$. Significance levels: $^{*}p < 0.10$, $^{**}p < 0.05$, $^{**}p < 0.01$.

Table D.10: IV estimates for VAT-Taxed Sales (2019, small and medium enterprises)

	Model (1)	Model (2)	Model (3)	Model (4)
log(Tranche B)	1.241***	1.172***	0.944***	0.907***
	(0.245)	(0.226)	(0.350)	(0.332)
Controls				
MET Criteria	Yes	Yes	Yes	Yes
Province FE	Not	Yes	Yes	Yes
Other Transfers	Not	Not	Yes	Yes
Lag Dep. Vars	Not	Not	Not	Yes
95% tF-adjusted C.I.				
Lower bound	0.761	0.730	0.258	0.257
Upper bound	1.722	1.614	1.630	1.557
Observations	221	221	221	221

Note: This table reports IV estimates where the endogenous regressor is the log of Tranche B in 2018, instrumented with the instrument Z. All regressions include the specified control variables: **MET criteria** correspond to the seven pre-reform allocation criteria defined in the transfer formula. **Province fixed effects** control for time-invariant provincial characteristics. **Other Transfers** includes log of Tranche A and other transfers (excluding Tranches A and B). **Lagged dependent variables** include 2017 outcomes, ensuring that results are not driven by pre-reform dynamics. Standard errors reported in parentheses are adjusted following the tF-procedure of Lee et al. (2022). The lower and upper bounds at the bottom correspond to the tF-adjusted 95% confidence interval for the coefficient on $\log(\text{Tranche B})_{2018}$. Significance levels: $^{*}p < 0.10$, $^{**}p < 0.05$, $^{**}p < 0.01$.

Table D.11: IV estimates for Non-VAT Sales (2019, small and medium enterprises)

	Model (1)	Model (2)	Model (3)	Model (4)
log(Tranche B)	1.246***	1.323***	1.301**	1.291**
	(0.384)	(0.318)	(0.580)	(0.556)
Controls				
MET Criteria	Yes	Yes	Yes	Yes
Province FE	Not	Yes	Yes	Yes
Other Transfers	Not	Not	Yes	Yes
Lag Dep. Vars	Not	Not	Not	Yes
95% tF-adjusted C.I.				
Lower bound	0.494	0.699	0.164	0.201
Upper bound	1.998	1.947	2.438	2.381
Observations	221	221	221	221

Note: This table reports IV estimates where the endogenous regressor is the log of Tranche B in 2018, instrumented with the instrument Z. All regressions include the specified control variables: **MET criteria** correspond to the seven pre-reform allocation criteria defined in the transfer formula. **Province fixed effects** control for time-invariant provincial characteristics. **Other Transfers** includes log of Tranche A and other transfers (excluding Tranches A and B). **Lagged dependent variables** include 2017 outcomes, ensuring that results are not driven by pre-reform dynamics. Standard errors reported in parentheses are adjusted following the tF-procedure of Lee et al. (2022). The lower and upper bounds at the bottom correspond to the tF-adjusted 95% confidence interval for the coefficient on $\log(\text{Tranche B})_{2018}$. Significance levels: $^{*}p < 0.10$, $^{**}p < 0.05$, $^{**}p < 0.01$.

Table D.12: IV estimates for Total Sales (2019, small and medium enterprises)

	Model (1)	Model (2)	Model (3)	Model (4)
log(Tranche B)	1.230***	1.218***	1.064***	1.045***
	(0.254)	(0.222)	(0.390)	(0.375)
Controls				
MET Criteria	Yes	Yes	Yes	Yes
Province FE	Not	Yes	Yes	Yes
Other Transfers	Not	Not	Yes	Yes
Lag Dep. Vars	Not	Not	Not	Yes
95% tF-adjusted C.I.				
Lower bound	0.732	0.783	0.300	0.310
Upper bound	1.727	1.652	1.829	1.780
Observations	221	221	221	221

Note: This table reports IV estimates where the endogenous regressor is the log of Tranche B in 2018, instrumented with the instrument Z. All regressions include the specified control variables: **MET criteria** correspond to the seven pre-reform allocation criteria defined in the transfer formula. **Province fixed effects** control for time-invariant provincial characteristics. **Other Transfers** includes log of Tranche A and other transfers (excluding Tranches A and B). **Lagged dependent variables** include 2017 outcomes, ensuring that results are not driven by pre-reform dynamics. Standard errors reported in parentheses are adjusted following the tF-procedure of Lee et al. (2022). The lower and upper bounds at the bottom correspond to the tF-adjusted 95% confidence interval for the coefficient on $\log(\text{Tranche B})_{2018}$. Significance levels: $^{*}p < 0.10$, $^{**}p < 0.05$, $^{**}p < 0.01$.

E Verifying Instrument Validity in a Nested Transfer System: Testing for Orthogonality Between Municipal and Provincial Instruments

As discussed in Section 2 of the manuscript, the 2018 reform to the Tranche B formula affected transfers to both municipal and provincial governments. Given Ecuador's nested intergovernmental structure—where municipalities are embedded within provinces—a concern is that provincial transfers may influence local activity independently of municipal transfers, potentially violating the exclusion restriction of our IV approach.

To address this, we construct a separate instrument for provincial transfers, defined analogously to the municipal IV. It is calculated as the ratio of actual to counterfactual Tranche B allocations at the provincial level, based on pre-reform characteristics and the new weighting scheme. Although the reform was implemented simultaneously across tiers, adjustments differed. For example, while the weight on "Population Size" was reduced from 10% to 5% for both municipalities and provinces, "Fiscal Effort" increased sharply from 10% to 25% for municipalities but remained unchanged for provinces. These asymmetric adjustments provide distinct exogenous variation at each level. If municipal and provincial instruments are statistically uncorrelated, this alleviates concerns that municipal transfer shocks are driven by concurrent provincial changes.

We empirically test this by regressing the municipal IV on the provincial IV. Across specifications, the provincial instrument does not significantly predict the municipal one. Estimated coefficients range from –0.17 to –0.23, and although one extended model yields a larger negative coefficient, it remains imprecise due to wide standard errors. The consistent lack of significance indicates that the municipal instrument captures an independent source of exogenous variation.

Demonstrating this orthogonality strengthens the credibility of our exclusion restriction and supports the validity of our identification strategy within a multi-tiered system. Combined with province fixed effects, this evidence reinforces the plausibility of our causal interpretation. We nonetheless acknowledge that unobserved, time-varying provincial shocks

(such as political changes or discretionary programs) could still bias estimates, though our design substantially mitigates this concern.

References

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