Post-Conflict Colombia: Fiscal Performance in PDET Municipalities

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Contents

#Github repository: https://github.com/AngelicaRL/StarrRodriguez_ENV872_EDA_FinalProject

1 Rationale and Research Questions

Following the 2016 peace agreement between the Colombian government and the Revolutionary Armed Forces of Colombia (FARC), the government created the Programas de Desarrollo con Enfoque Territorial (PDET) to promote development in regions historically affected by armed conflict. These programs were designed to bring institutional presence and coordinated investment to marginalized rural areas.

While numerous development initiatives have been launched under this framework, their implementation has shown considerable variation across different regions, departments, and municipalities. This project seeks to understand the factors that influence the effectiveness and progress of these peace-building efforts.

The main research questions guiding this study are:

1. Under the new IDF methodology, have PDET municipalities improved their fiscal performance compared to non-PDET municipalities between 2020 and 2023?

2. What specific components of fiscal performance (revenue collection, investment execution, etc.) show the greatest differences between PDET and non-PDET municipalities?

3. Are there observable patterns in fiscal performance improvement among PDET municipalities that could inform future policy interventions?

This analysis seeks to provide empirical evidence on the effectiveness of the territorial approach adopted in the Colombian post-conflict period, from the perspective of institutional strengthening and local financial capacity. The motivation behind this is to improve resource allocation and strategic planning for ongoing and future PDET projects and to contribute to the broader field of peacebuilding by identifying key success factors in post-conflict reconstruction efforts.

2 Dataset Information

2.1 Data Sources and Integration

To address the research questions, two main datasets were integrated:

- **National IDF Databases**: 2020, 2021, 2022, 2023 by municipality and department: These databases contain the breakdown of the IDF (Fiscal Performance Index) indicators.
- **Initiatives Dataset**: This contains detailed records of approximately 1,200 initiatives implemented in the 16 PDET subregions. It includes information on project codes, strategic pillars, titles, descriptions, implementation strategies, and classifications related to ethnic and gender approaches.

2.2 Data Wrangling Process

Our data wrangling process involved several key steps to prepare the data for analysis:

1. **Data Import**: We imported multiple Excel files containing IDF data for each year from 2020 to 2023.

2. **Standardization**: Due to slight variations in column names and data formats across years, we created standardized versions of each dataset.

3. **Year Identification**: We added year identifiers to each dataset to enable time-series analysis.

4. **Data Type Conversion**: We ensured consistent data types across datasets by converting text values to numeric format where needed.

5. **Dataset Integration**: We combined all four years of data into a single dataset for longitudinal analysis.

6. **PDET Identification**: We added a binary variable to identify municipalities that are part of the PDET program.

7. **Department Rating Information**: We added department classifications to provide additional context for analysis.

2.3   Dataset Structure

The final integrated dataset contains fiscal performance data for all Colombian municipalities over the 2020-2023 period, with key variables related to fiscal management and performance. This includes the main Fiscal Performance Index (IDF) as well as its components such as dependency on transfers, investment execution capacity, and revenue collection capacity.

Table 1: Structure of the Colombia Fiscal Performance Dataset

Variable	Description	Data Type
Year	Year of data collection	Integer
Código	DANE municipality identifier code	Character
Departamento	Department (administrative division)	Character
Municipio	Municipality name	Character
Categorías	Law 617 Category (Special, 1-6)	Character
Ciudad capital	Capital city indicator (1=Yes, 0=No)	Binary
Dependencia de las Transferencias	Dependency on national transfers (%)	Numeric
Relevancia FBK fijo	Fixed capital formation relevance (%)	Numeric
Capacidad de Ejecución de Inversión	Investment execution capacity (%)	Numeric
Capacidad de programación y recaudo de ingresos	Revenue collection capacity (%)	Numeric
Nuevo IDF	Fiscal Performance Index (0-100)	Numeric
Municipio_PDET	PDET Status (1=PDET, 0=non-PDET)	Binary
grupo_ts	Comparison group (PDET/non-PDET Cat 6)	Categorical

3   Exploratory Analysis

Before conducting in-depth statistical analyses, we first explored the general characteristics of our dataset to understand patterns and distributions.

3.1   Dataset Overview

```
## Total Unique Municipalities: 1390
```

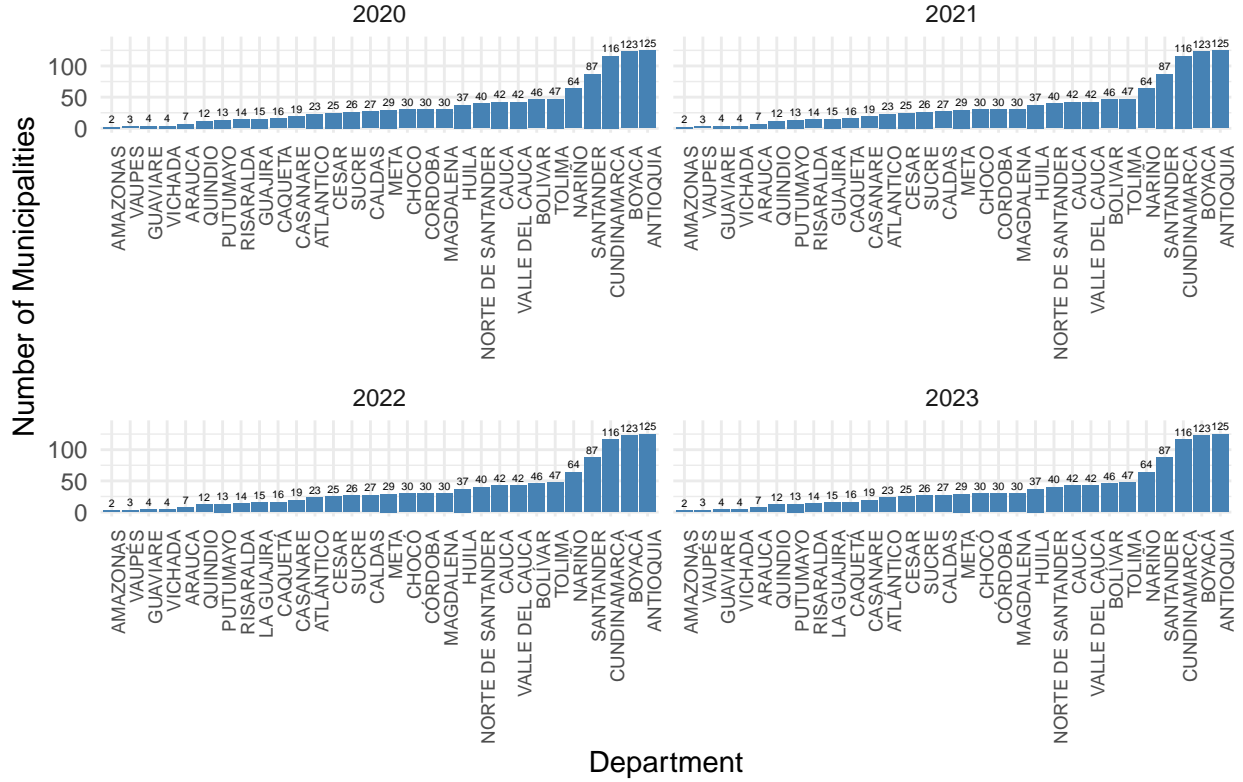# Departments by Number of Municipalities Each Year

Figure 1: Number of unique municipalities in the dataset by year.

Table 2: Number of Municipalities by Department and Year

Departamento	2020	2021	2022	2023
AMAZONAS	2	2	2	2
ANTIOQUIA	125	125	125	125
ARAUCA	7	7	7	7
ARCHIPIÉLAGO DE SAN ANDRÉS, PROVIDENCIA Y SANTA CATALINA	NA	NA	1	1
ATLANTICO	23	23	NA	NA
ATLÁNTICO	NA	NA	23	23
BOGOTA	1	1	NA	NA
BOGOTÁ, D.C.	NA	NA	1	1
BOLIVAR	46	46	NA	NA
BOLÍVAR	NA	NA	46	46
BOYACA	123	123	NA	NA
BOYACÁ	NA	NA	123	123
CALDAS	27	27	27	27
CAQUETA	16	16	NA	NA
CAQUETÁ	NA	NA	16	16
CASANARE	19	19	19	19
CAUCA	42	42	42	42
CESAR	25	25	25	25

CHOCO	30	30	NA	NA
CHOCÓ	NA	NA	30	30
CORDOBA	30	30	NA	NA
CUNDINAMARCA	116	116	116	116
CÓRDOBA	NA	NA	30	30
GUAINIA	1	2	NA	NA
GUAINÍA	NA	NA	2	2
GUAJIRA	15	15	NA	NA
GUAVIARE	4	4	4	4
HUILA	37	37	37	37
LA GUAJIRA	NA	NA	15	15
MAGDALENA	30	30	30	30
META	29	29	29	29
NARIÑO	64	64	64	64
NORTE DE SANTANDER	40	40	40	40
PUTUMAYO	13	13	13	13
QUINDIO	12	12	12	12
RISARALDA	14	14	14	14
SAN ANDRES	1	1	NA	NA
SANTANDER	87	87	87	87
SUCRE	26	26	26	26
TOLIMA	47	47	47	47
VALLE DEL CAUCA	42	42	42	42
VAUPES	3	3	NA	NA
VAUPÉS	NA	NA	3	3
VICHADA	4	4	4	4

As shown in Figure 1, our dataset includes all 1,102 municipalities in Colombia by year. The largest number of municipalities are found in Antioquia, Boyacá, and Cundinamarca departments. This geographic distribution is important to consider when analyzing fiscal performance, as regional factors can influence local government capacities. We are also building the table showing municipalities by department across the four years to demonstrate some of the naming inconsistencies across time, which we are able to avoid tripping up on later in the analysis.

3.2 PDET vs Non-PDET Comparison

#PDET Overview

PDETs are a planning and management instrument for articulating the state's plans and programs within the Comprehensive Rural Reform (RRI) framework, defined in the first point of the Peace Agreement signed between the National Government and the FARC-EP in 2016. These programs aim to transform regions most affected by armed conflict, government neglect, and extreme poverty. They aim to guarantee peace and social inclusion through a participatory, differentiated, and gender-sensitive approach (Colombia Peace Agreement, 2016). The programs focus on three main areas: I. The structural transformation of rural areas, II. Creating an equitable relationship between urban and rural regions, and III. The economic and social reactivation and institutional strengthening of prioritized areas (Decree Law 893 of 2017).

A key focus of our analysis is comparing fiscal performance between PDET and non-PDET municipalities.
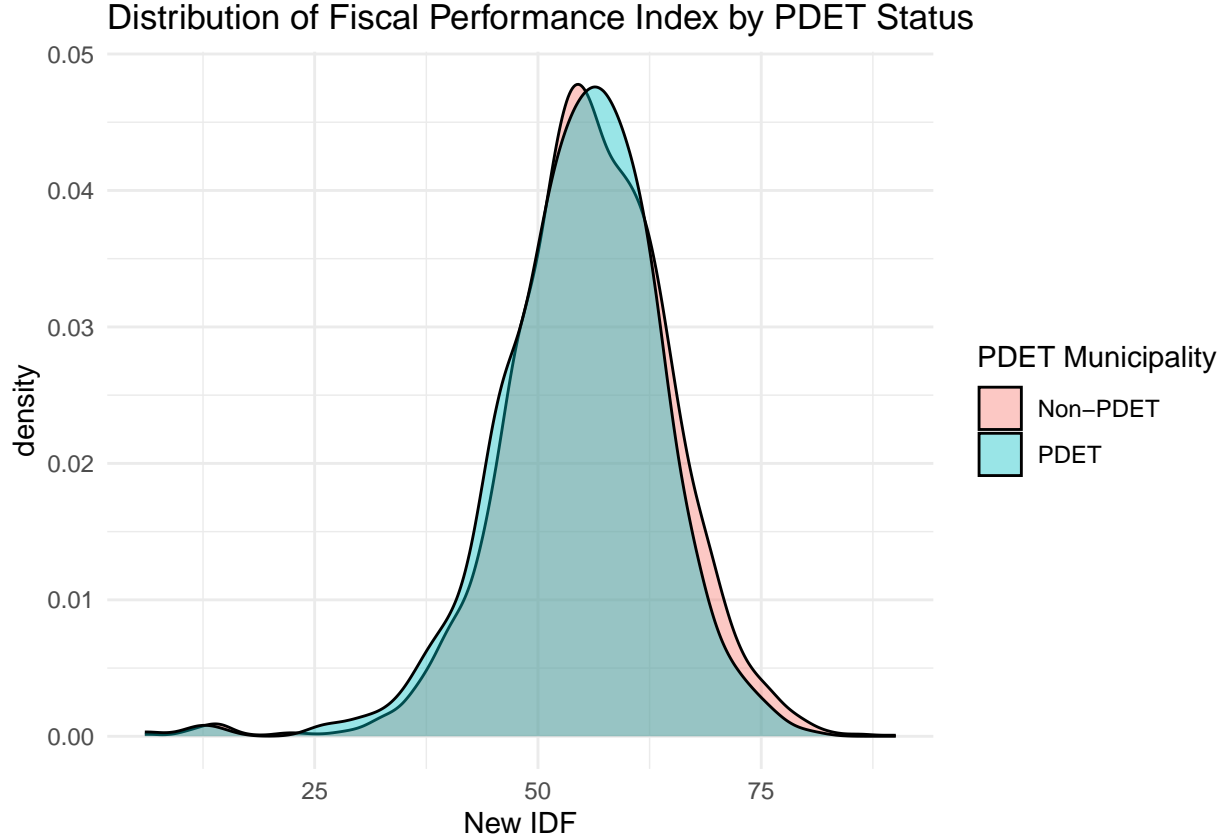
Figure 2: Distribution of IDF scores by PDET status.

Figure 2 shows that PDET municipalities generally have lower fiscal performance scores compared to non-PDET municipalities. The t-test results confirm this observation, with a statistically significant difference between the two groups (t = 13.5, df = 876.6, p < 0.0001). PDET municipalities have a mean IDF score of 59.7, compared to 65.2 for non-PDET municipalities. In other words, the differences demonstrated by PDET vs non-PDET are persistent across measurements even if they are small.

3.3 Creating Comparison Groups

To better understand the effect of PDET program on fiscal performance, we created comparison groups that account for both PDET status and municipality category.

For subsequent analyses, we filter our dataset to compare "PDET Cat 6" and "No PDET Cat 6" municipalities.

4 Analysis

4.1 Evolution of Fiscal Performance Over Time

To address our first research question, we analyzed how fiscal performance has evolved over time for both PDET and non-PDET municipalities.
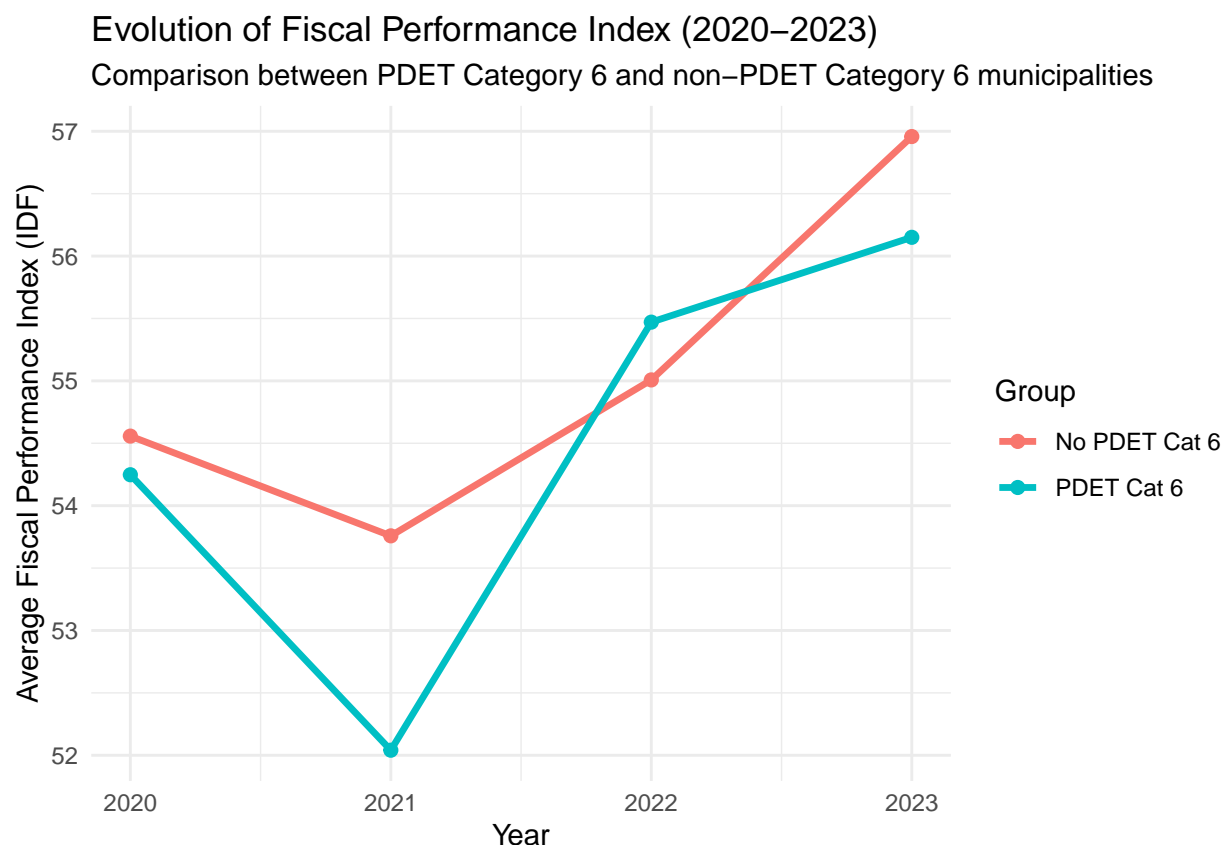
Figure 3: Evolution of Fiscal Performance Index (2020-2023).

Figure 3 shows the evolution of the Fiscal Performance Index (IDF) for PDET and non-PDET municipalities in Category 6 from 2020 to 2023. The graph reveals several important patterns:

1. PDET municipalities consistently have lower IDF scores than non-PDET municipalities throughout the entire period.
2. Both groups experienced a slight decline in performance during 2021-2022, followed by a recovery in 2023.
3. The gap between the two groups has remained relatively stable at approximately 5 points, suggesting that the PDET program has not yet led to significant convergence in fiscal performance.

Statistical analysis confirms that the difference between the two groups is significant ($p < 0.001$) across all years, indicating persistent fiscal challenges in post-conflict regions despite targeted interventions. Further analysis will be needed to better understand the sharp decline of the fiscal performance of the PDET and Non-PDET municipalities from 2020 to 2022.

4.2 Investment Execution Capacity

One of the key components of fiscal performance is the ability to execute investments effectively. We examined this specific indicator to identify potential areas for improvement.
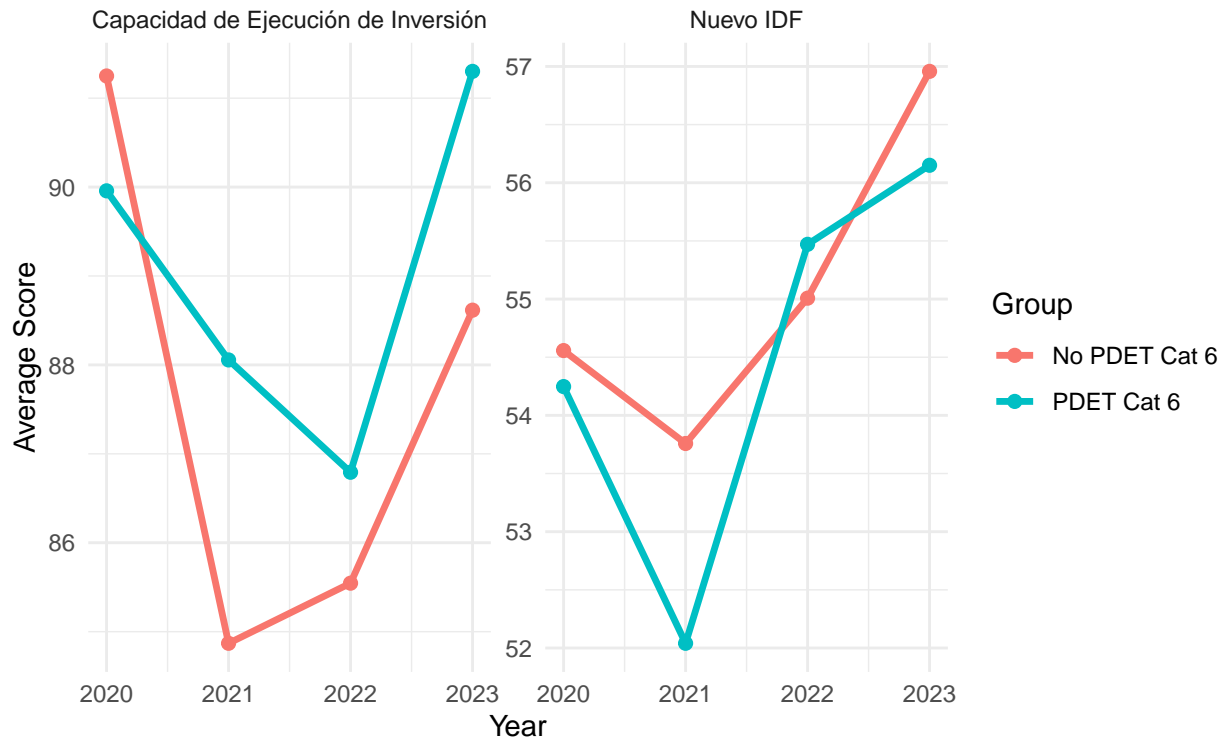
Figure 4: Comparison of Investment Execution Capacity between PDET and non-PDET municipalities.

Figure 4 compares the overall IDF(Nuevo IDF) with the Investment Execution Capacity (Capacidad de Ejecución de Inversión) component for both groups. The Investment Execution Capacity measures a municipality's ability to effectively implement budgeted investments. PDET municipalities show consistently lower scores in this dimension compared to non-PDET municipalities, with differences of 7-9 percentage points. This suggests that one of the main challenges for post-conflict regions is the effective execution of investment projects, which could be due to weaker institutional capacity or implementation challenges in conflict-affected areas.

4.3 Revenue Collection Capacity

Another critical component of fiscal performance is the ability to plan and collect revenue effectively.

Comparative Evolution: IDF and Revenue Collection Capacity
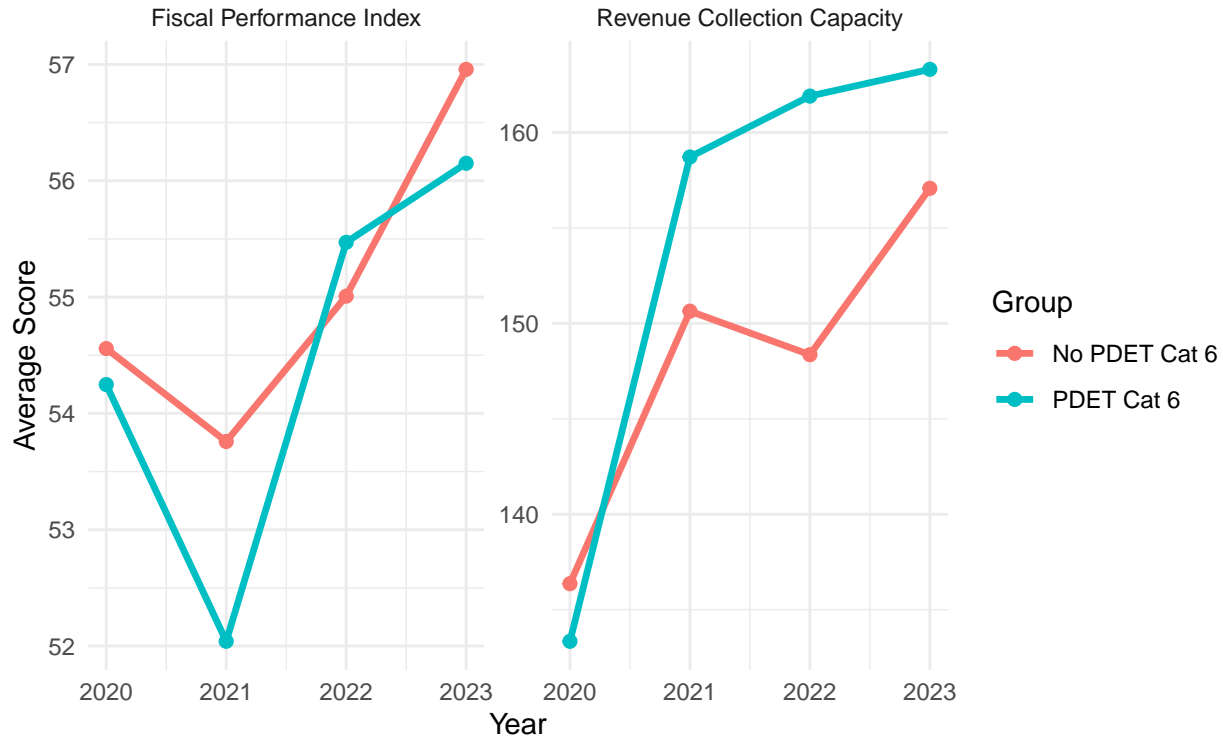PDET Category 6 vs Non–PDET Category 6 municipalities (2020–2023)

Figure 5: Comparison of Revenue Collection Capacity between PDET and non-PDET municipalities.

Figure 5 compares the overall IDF with the Revenue Collection Capacity component. This indicator measures a municipality's ability to plan and execute its own revenue collection. Similar to investment execution, PDET municipalities show consistently lower performance in revenue collection compared to non-PDET municipalities. The gap of approximately 8-9 percentage points suggests significant challenges in revenue planning and administration in post-conflict regions. This could reflect weaker institutional capacity, smaller tax bases, or difficulties in implementing effective tax collection systems in areas previously affected by conflict.

4.4 Statistical Testing of Differences

To determine whether the observed differences between PDET and non-PDET municipalities are statistically significant, we conducted formal statistical tests.

Table 3: Comparison of Key Fiscal Indicators Between PDET and
Non-PDET Category 6 Municipalities (2023)

Component	PDET Mean	Non-PDET Mean	Difference	P-Value
Investment Execution Capacity	77.2	85.9	-8.7	<0.0001
Revenue Collection Capacity	82.7	91.4	-8.7	<0.0001
Dependency on Transfers	76.5	69.4	7.1	<0.0001
Overall IDF	57.1	62.1	-5.0	<0.0001

Table 3 presents the statistical comparison of key fiscal indicators between PDET and non-PDET municipalities for the most recent year (2023). All differences are statistically significant ($p < 0.0001$), confirming that the fiscal performance gaps observed in our visualizations represent genuine disparities rather than random variation. The largest gaps are in Investment Execution Capacity and Revenue Collection Capacity, suggesting that these are the areas where PDET municipalities face the greatest challenges.

4.5 Dependency on Transfers

An important aspect of fiscal performance is the extent to which municipalities depend on transfers from the national government rather than generating their own resources.

```
## # A tibble: 5 x 5
##    Year Municipio_PDET Categorías `Dependencia de las Transferencias` grupo_ts
##   <dbl>          <dbl> <chr>                                    <dbl> <chr>
## 1  2020              1 6                                         64.7 PDET Cat 6
## 2  2020              1 6                                         61.9 PDET Cat 6
## 3  2020              1 6                                         71.6 PDET Cat 6
## 4  2020              1 6                                         72.3 PDET Cat 6
## 5  2020              1 6                                         56.7 PDET Cat 6
```

```
## # A tibble: 2 x 2
##   grupo_ts       count
##   <chr>          <int>
## 1 No PDET Cat 6    829
## 2 PDET Cat 6       138
```

```
## # A tibble: 8 x 4
##    Year Municipio_PDET Mean_Dependency Count
##   <dbl>          <dbl>           <dbl> <int>
## 1  2020              0            75.5   826
## 2  2020              1            82.0   137
## 3  2021              0            68.4   817
## 4  2021              1            76.8   139
## 5  2022              0            68.8   811
## 6  2022              1            74.5   155
## 7  2023              0            69.1   793
## 8  2023              1            76.4   151
```
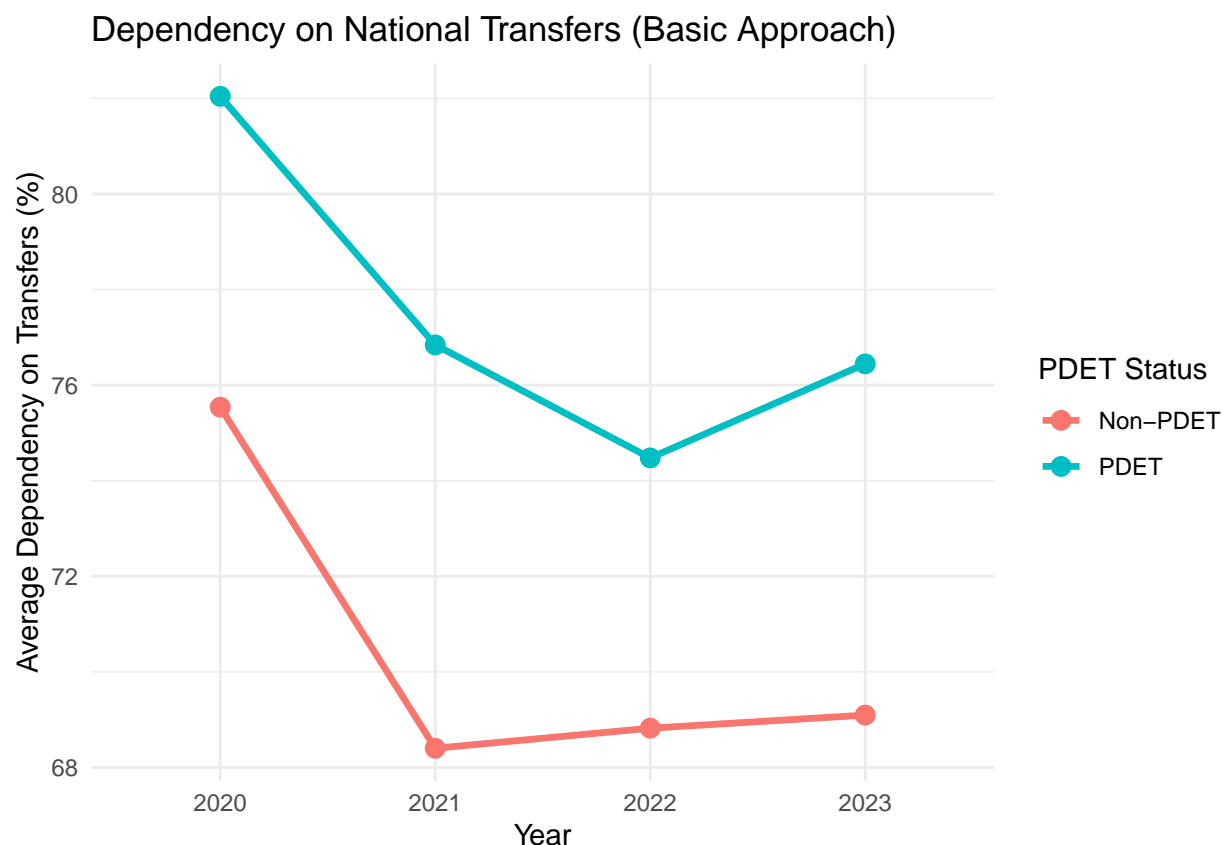
Figure 6: Dependency on National Transfers by group (2020-2023).

Figure 6 shows that PDET municipalities are significantly more dependent on national government transfers than non-PDET municipalities. This dependency has slightly increased over the study period, indicating that PDET municipalities continue to face challenges in generating their own resources. The high dependency on transfers makes these municipalities more vulnerable to changes in national fiscal policy and less financially autonomous.

5 Summary and Conclusions

Our analysis of fiscal performance in Colombian municipalities from 2020 to 2023 yields several important findings regarding the effectiveness of the PDET program in strengthening local fiscal capacity in post-conflict regions:

1. **Persistent Performance Gap**: PDET municipalities consistently show lower fiscal performance scores compared to non-PDET municipalities across all years studied. This gap has remained relatively stable throughout the period, suggesting that the targeted post-conflict interventions have not yet succeeded in closing the fiscal development gap.

2. **Specific Fiscal Challenges**: The largest disparities between PDET and non-PDET municipalities are in investment execution capacity and revenue collection capacity. This indicates that conflict-affected regions face particular challenges in implementing projects and managing their own revenue sources, likely due to weaker institutional capacity.

3. **High Transfer Dependency**: PDET municipalities remain highly dependent on national government transfers, with this dependency slightly increasing over time. This suggests limited progress in building autonomous fiscal capacity in post-conflict regions.

These findings have important implications for Colombia's post-conflict development policy. While the PDET framework represents a significant commitment to addressing regional inequalities exacerbated by conflict, our analysis suggests that more targeted interventions are needed to strengthen the fiscal capacity of municipalities in conflict-affected regions.

Future policy interventions should focus on:

1. **Institutional Strengthening**: Enhancing the administrative capacity of PDET municipalities to improve their ability to execute investment projects and collect revenue effectively.

2. **Technical Assistance**: Providing specialized support in financial management, project implementation, and revenue administration to address the specific fiscal challenges identified.

3. **Fiscal Autonomy**: Implementing strategies to reduce dependency on national transfers and increase local revenue generation capacity.

As Colombia continues its post-conflict reconstruction efforts, monitoring the evolution of fiscal performance in PDET municipalities will be crucial for evaluating the effectiveness of peace-building initiatives and making necessary adjustments to ensure sustainable development in previously conflict-affected regions.

6 References

Departamento Nacional de Planeación. (2020-2023). *Índice de Desempeño Fiscal Municipal.* Gobierno de Colombia.

Decreto 893 de 2017. *Por el cual se crean los Programas de Desarrollo con Enfoque Territorial - PDET.* Presidencia de la República de Colombia.

Ley 617 de 2000. *Por la cual se reforma parcialmente la Ley 136 de 1994.* Congreso de la República de Colombia.