



# Natural Resource Rents and Redistribution: The Effect of Mining- Based Transfers on Local Populations in Peru

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June 21, 2011

# Introduction

- Since 1996 in Peru: A Constitutional right allows local governments to obtain a percentage of the rents from the natural resources in their jurisdiction
- =>The Peruvian government has transferred 50% of mining firms' income tax back to local governments for over a decade. This transfer is called the "Mining Canon".
- From 1996 to 2010: mining canon= 5.6 billion USD (as a comparison : 3.6% of the 2010 Peruvian nominal GDP).
- Given the important amount of transfers done by the central government to local governments , this money should have been invested and had some effect on local populations.

# Motivation

- However, evidence suggests that this is not the case.
- In 2008: only 10% of the districts had complete public lighting, 26% of the districts cleaned their used waters and 53% had access to the internet.
- This seems to be not only the case for districts that receive small transfers. The district of San Marcos (13600 habitants), home to one of the biggest copper and zinc mines in the world, received 76.6 million USD from 2001 to 2007.
- In 2007: San Marcos had only partial access to electricity, only 50% of its houses had access to potable water and 53% of its active population was formally employed.

# Purpose of this Paper

- Given this striking paradox, I seek to quantify the impact of mining windfalls on poverty.
- In particular, through a unique dataset that matches canon data with a household national survey and using exogenous variation in mineral prices, I test the impact of mining- based transfers on educational and income outcomes in Peru for the 2004-2010 period.

# Literature Review

- Cross- country studies

**Sachs and Warner (1995,1997,2001)(negative)**

Isham, Woolcock, Pritchett and Busby (2005) (negative)

Collier and Goderis (2007) (negative)

Brunnschweiler and Bulte (2008) (positive)

- Within country studies

Sala-i-Martin and Subramanian (2003) (negative)

Vicente (2008) (negative)

Caselli and Michaels (2009) (negative)

- Peruvian studies

Barrantes et al. (2005) (mixed)

Zegarra et al. (2007) (negative but with some positive impacts)

Aragon and Rud (2009) (positive)

# Potential Contributions of this Study

- 1) Quantify the impact of this resource based transfer.
- 2) Contribute to the within- country Natural Resource Curse literature by providing a finer level of analysis for a longer period of time.
- 3) Provide insights on the role of corruption and spending capacity in the particular context of exogenous variation in windfalls to the development and political economy literature.

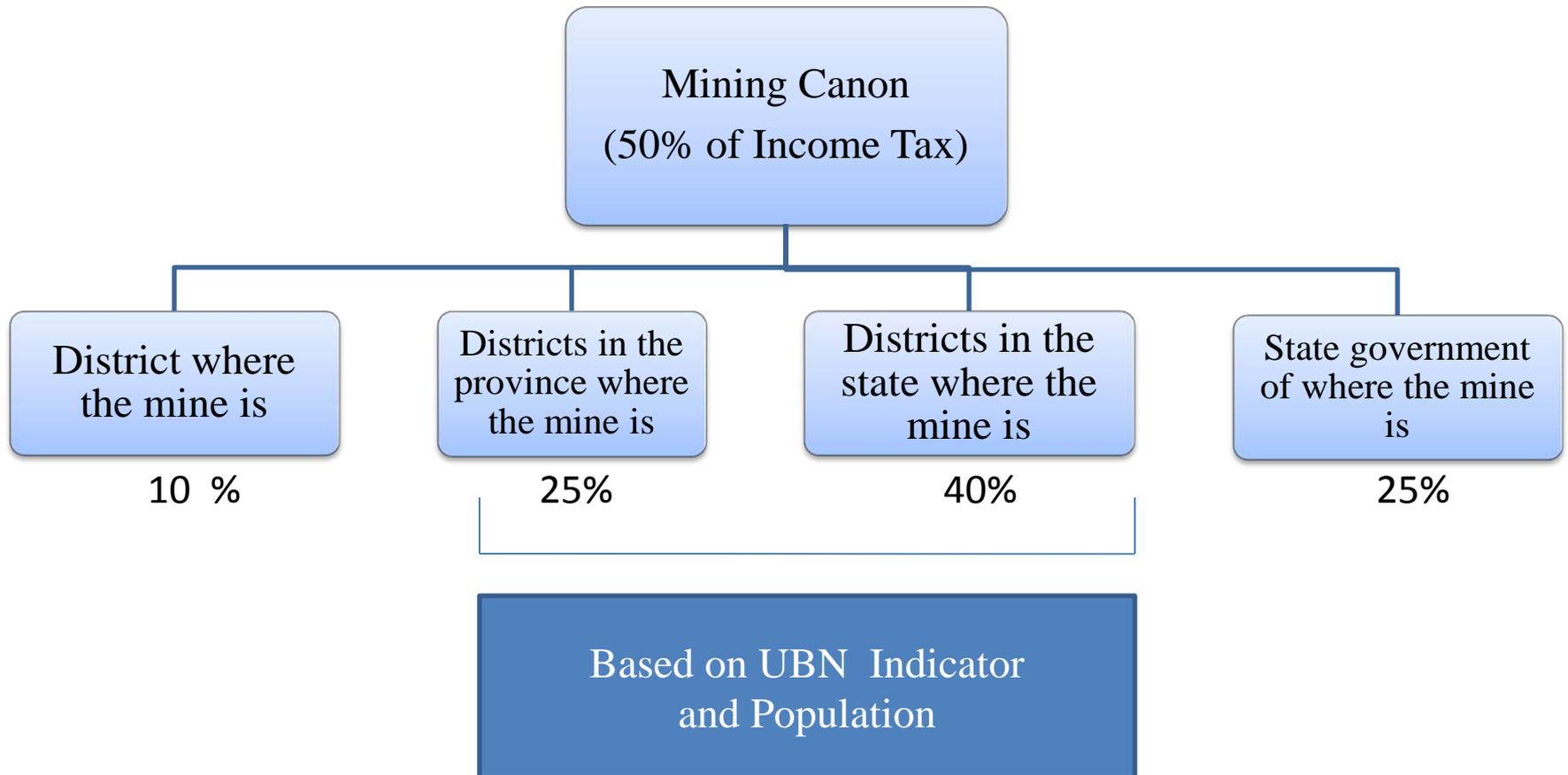
# Mining and the Mining Canon in Peru

- Mining in Peru: 6% of GDP, 4% of formal labor and 60% of total exports.
- The central government redistributes 50% of what mining firms pay as income tax back to local governments.
- Peru is divided into 25 states, states are divided into 195 provinces and provinces are divided into 1834 districts.
- In 2008, the mining canon:
  - was the most important transfer and represented 40% of all the transfers made by the central government to the districts
  - constituted 22% of the average district's revenue, with important variation among districts
- The mining canon can only be used on capital goods (i.e. investments). When it is not used in a particular year, it is saved and can be used in a later year.

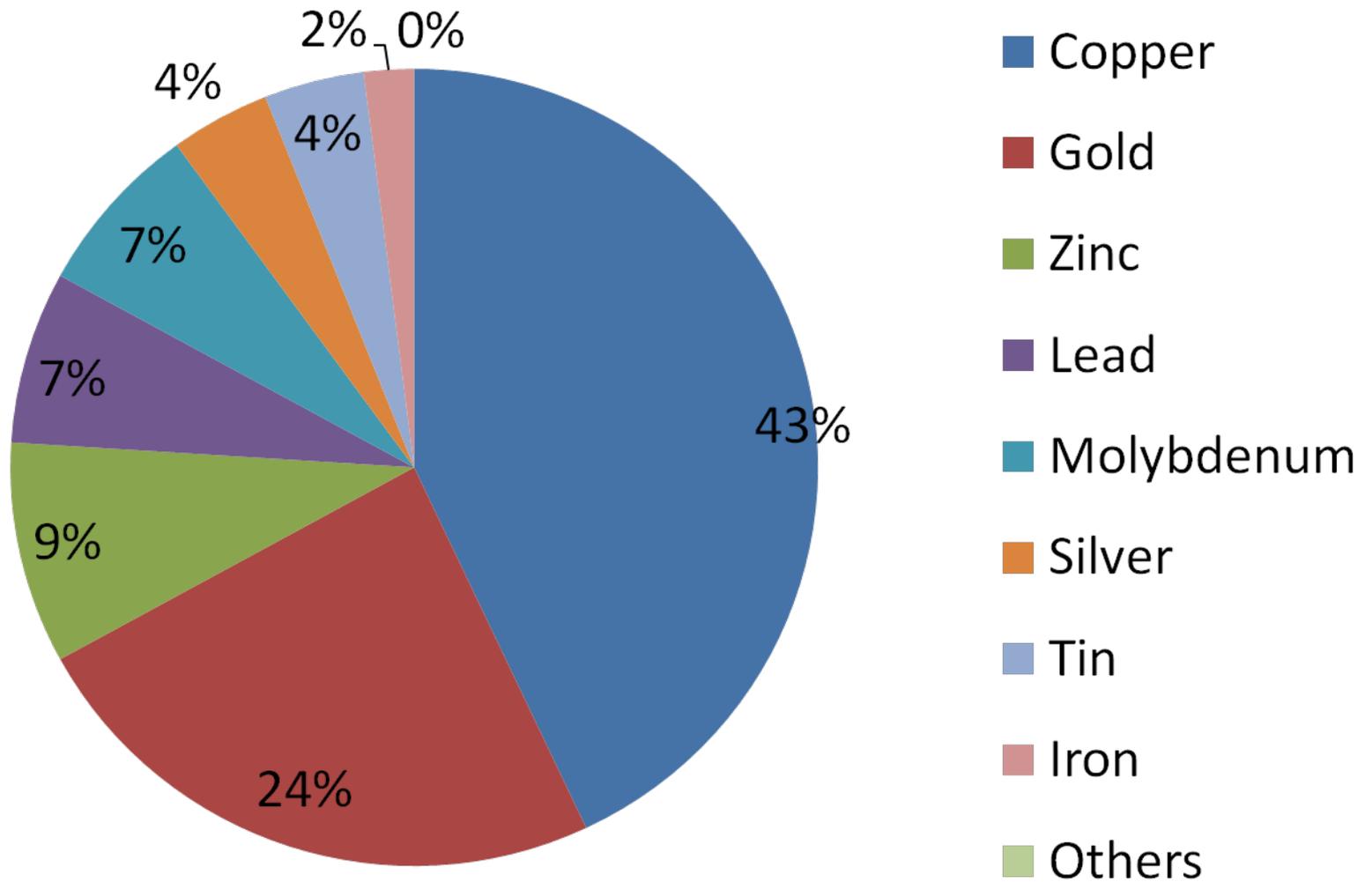
# Distribution Criteria of the Mining Canon

- The mining canon is not an additional tax paid by mining firms.
- It is only paid if the mining firm is making profits.
- The amount of transfer a district receives depends on three factors:
  - 1) Profits of the mining firms
    - which depend on international mineral prices
  - 2) Population of a district
    - districts with higher population receive more transfers
  - 3) Poverty of a district
    - poorer districts receive more transfers
    - poverty is measured by a Unsatisfied Basic Needs (UBN) indicator, the higher the indicator, the poorer the district

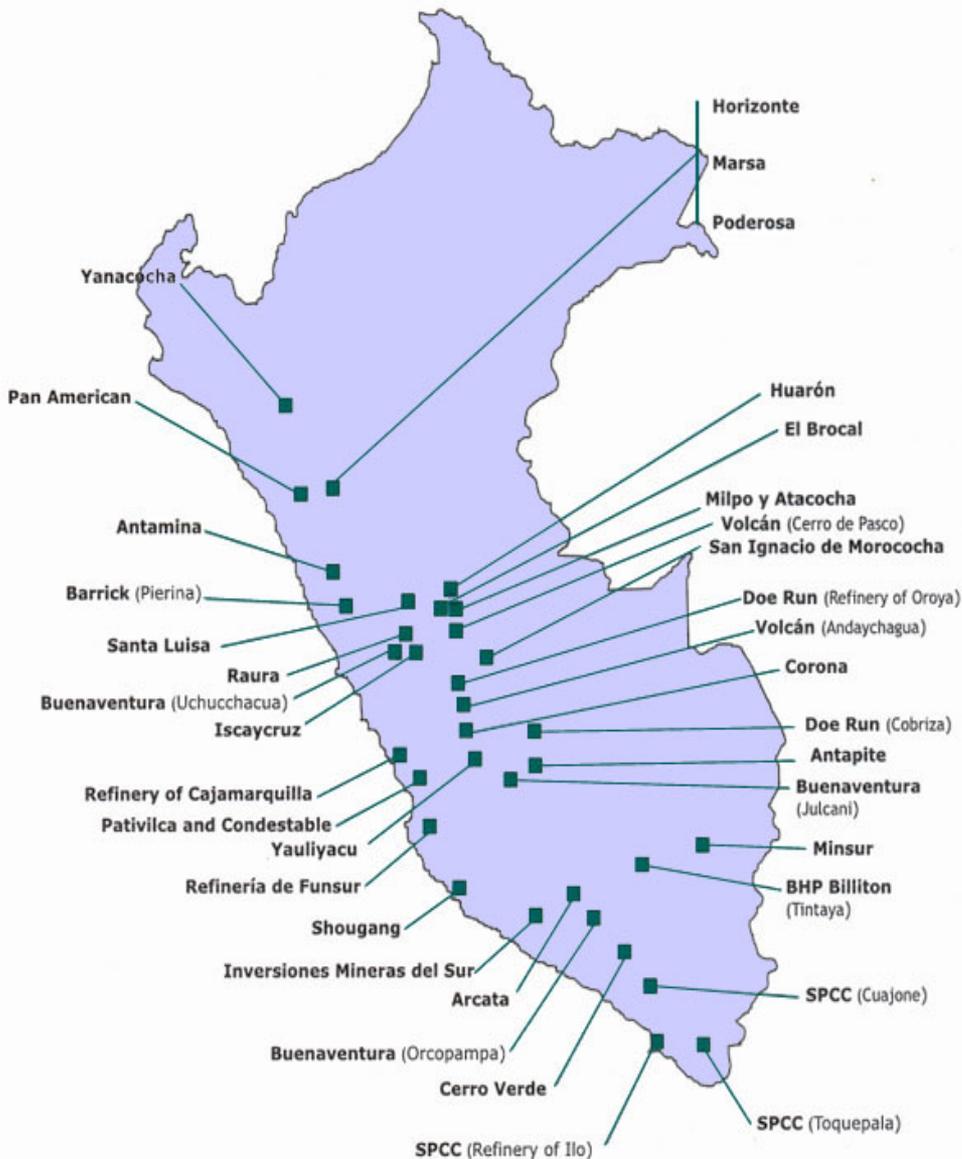
# Mining Canon Distribution



# Mineral Exports that Generate the Mining Canon(2008)



# Main Mining Units and Producer Districts

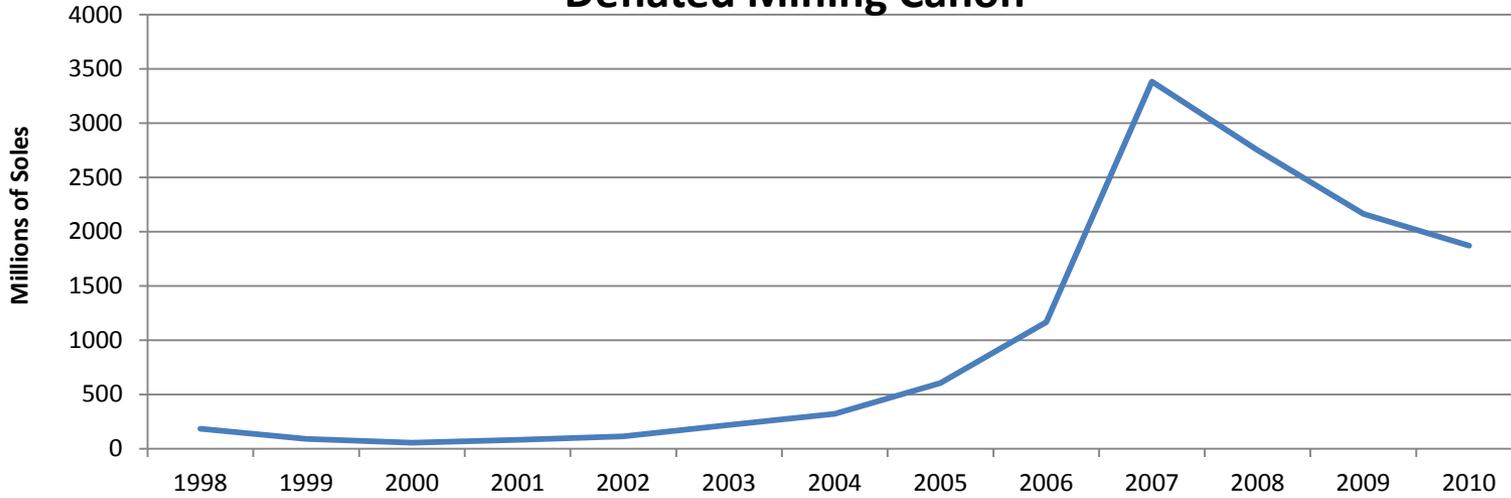


- Mining units are spread across the country.
- Only 3 states out of 25 do not receive mining transfers. They receive plenty of oil transfers.
- This spread of mining units translates into cross sectional variation of transfers across districts and states.

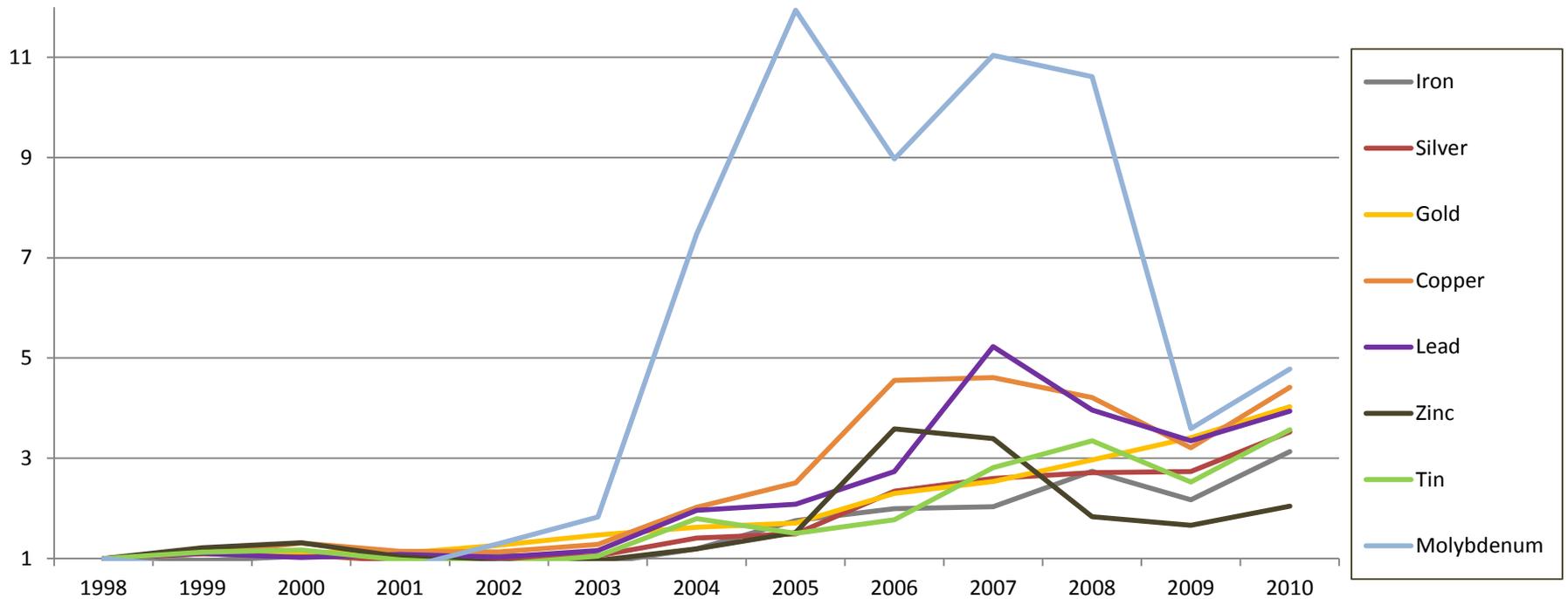


# Evolution of the Real Mining Canon and Mineral Prices

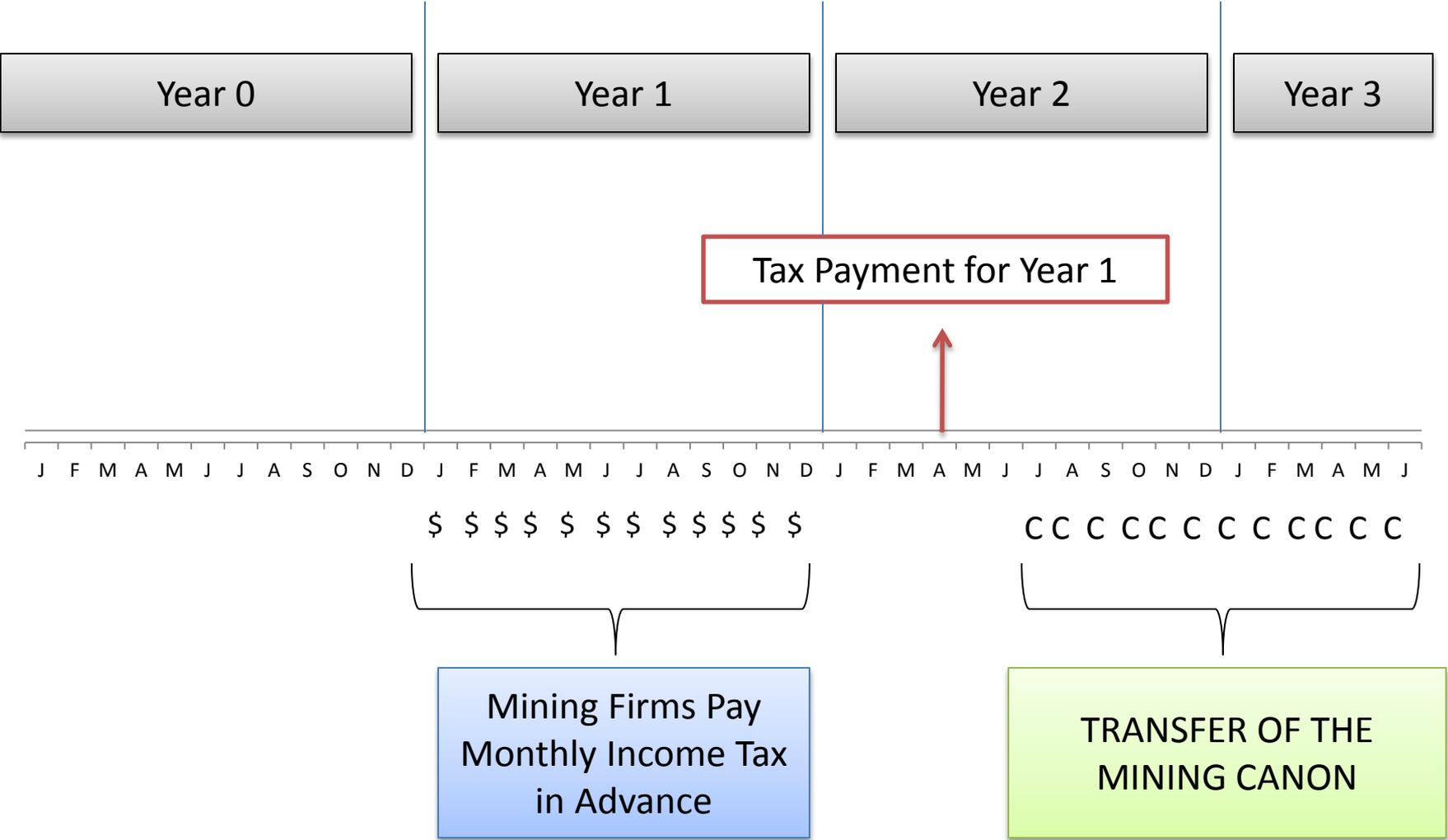
## Deflated Mining Canon



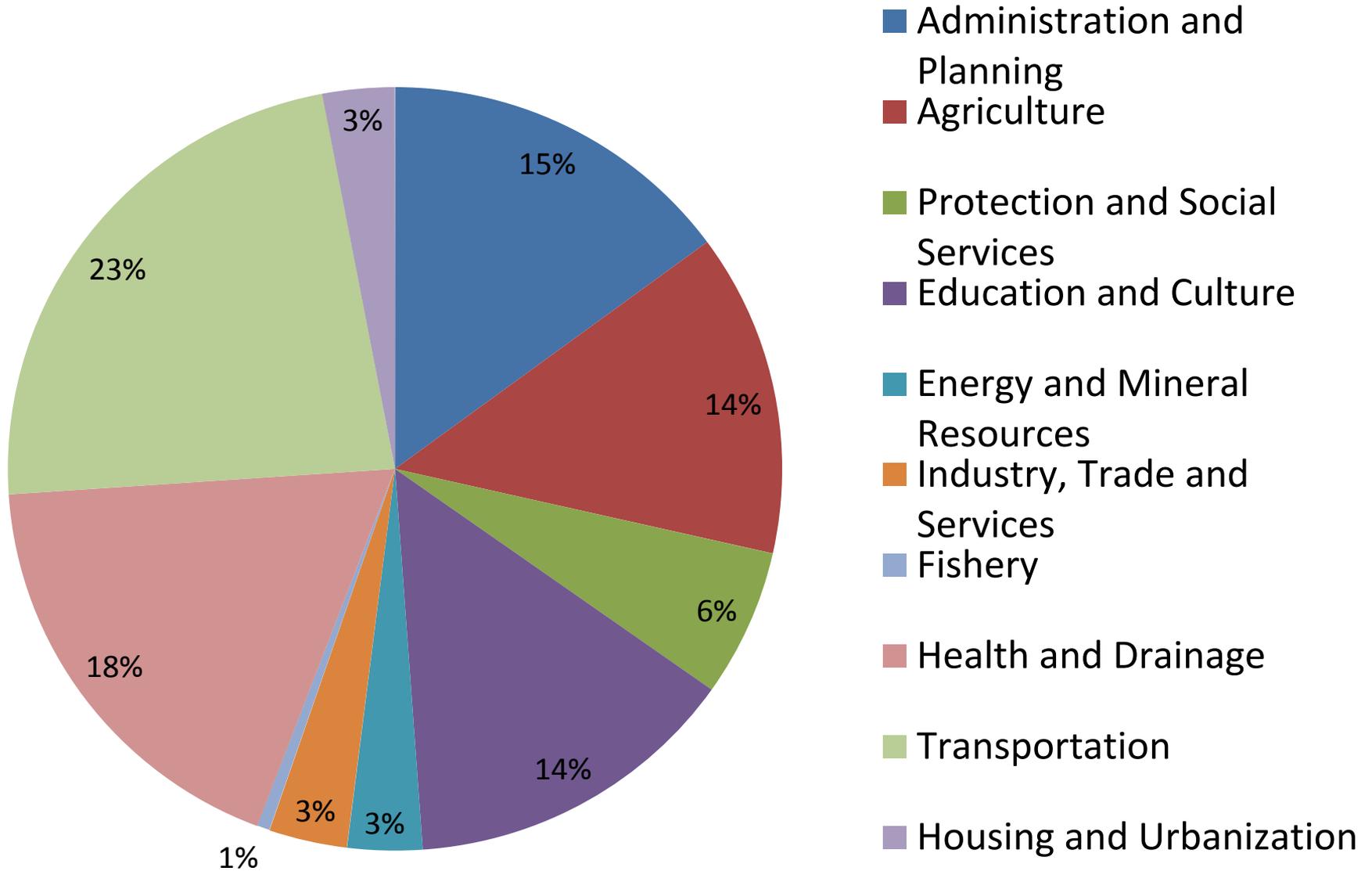
## Evolution of Mineral Prices (base year=1998)



# Timing of the Mining Canon Distribution (1997-2006)



# Spending of the Mining Canon Budget by Districts, 2008



# Possible Transmission Mechanisms

## 1) **Direct effect on the HH head's income**

Ex: construction worker for roads or bridges

and **indirect jobs provide additional income for HH**

Ex: women who provide lunch for construction workers

## 2) **Indirect effect of additional income**

Ex: children in HH can work less or even stop working

## 3) **Investment itself**

Although local governments are not responsible for education they spend around 15% of the revenues from the mining canon on construction and maintenance of schools. They also spend on electrification projects, sewage and drainage.

## 4) **Multiplier effect?**

A fourth broader possible mechanism (which would have to be tested) is the existence of a multiplier effect of the mining canon.

# Data

- The data consist of a panel of all the transfers from the central government to the local governments for the universe of districts in Peru from 2001 to 2010 merged with a household survey.
- The household survey (ENAHO) :
  - has detailed individual data from repeated cross sections on demographics, income, spending, education
  - is undertaken quarterly by the National Statistics Bureau (INEI)
  - consists of stratified household samples which are representative at the state, regional and national level
  - has a sample size of around 90000 observations/22000 households per year
- This study uses the data on education, income and demographics from 2004-2010
- Both datasets are publicly available online

# Estimation

$$Y_{ijt} = \alpha + \beta \text{Transfer}_{j,t-1,-2,-3} + \gamma X_{ijt} + \eta_j + \delta_t + \varepsilon_{ijt}$$

- $Y_{ijt}$  is some outcome such as education or income for person or household  $i$  in district  $j$  and year  $t$
- $\text{Transfer}_{j,t-1,-2,-3}$  is the transfer in district  $j$  in year  $-1,-2$  or  $-3$  depending on the lag assumed
- $X_{ijt}$  is a vector of individual or household characteristics for person or household  $i$  in district  $j$  and year  $t$
- $\eta_j$  is a district fixed effect
- $\delta_t$  is a year fixed effect
- $\varepsilon_{ijt}$  is a random error term clustered at the state level
- The date and location of a person jointly determine the exposure of an individual's local government to transfers

# On the Endogeneity of the Transfers

- The transfers are endogenous.
- The endogeneity is due to the UBN indicator used in the distribution of the canon  
i.e. poorer districts receive more transfers
- Other factors linked to education and income also affect transfers.

Example: individuals in less educated districts or in districts with lower income might undertake more strikes therefore reducing mining profits and thus transfers.

# The Instrument (1)

- An instrumental variable is used to deal with endogenous transfers.
- The instrumental variable consists of several mineral prices.

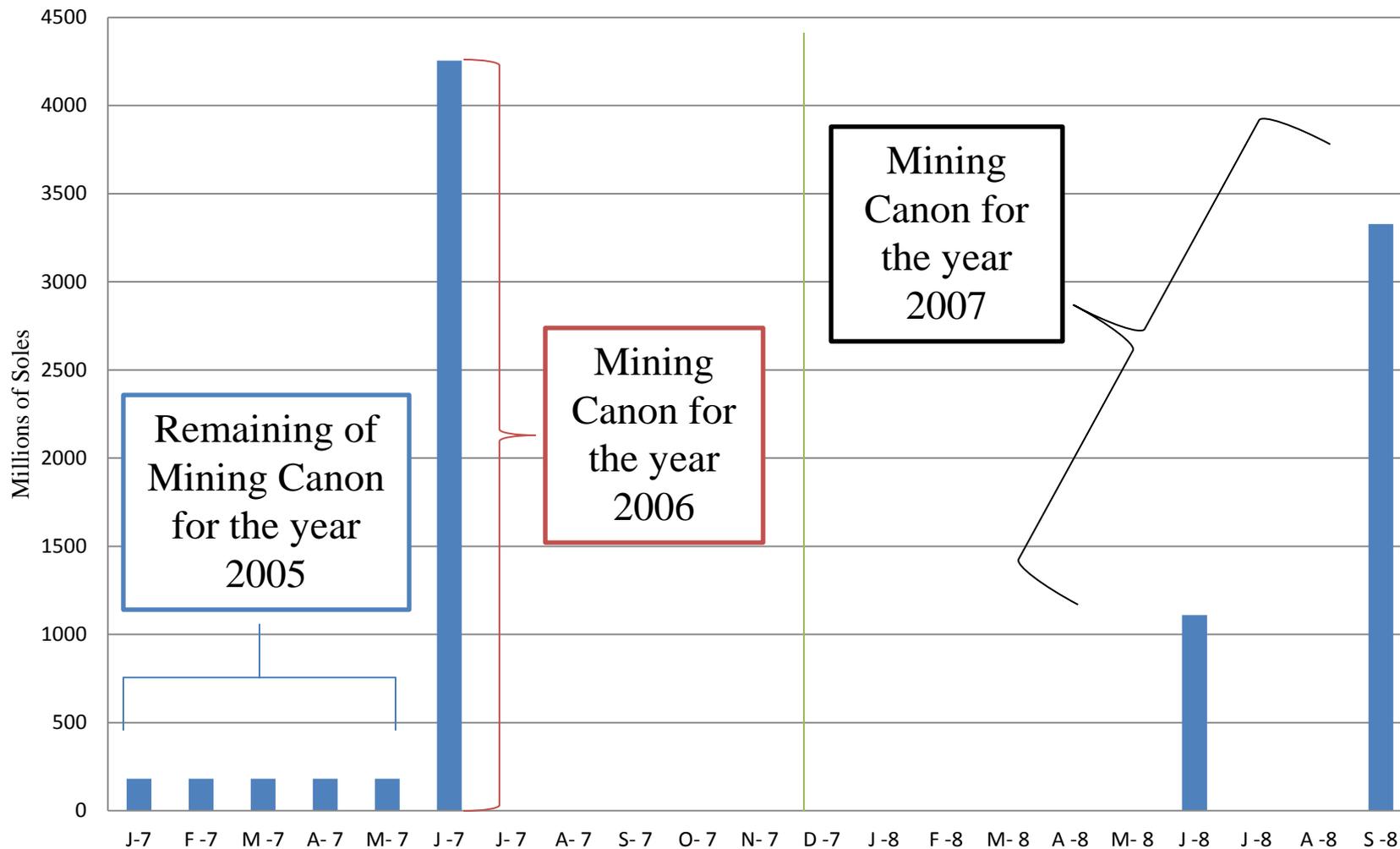
# The Instrument (2)

The instrument:

- 1) Is correlated with mining transfers since transfers depend on the profits of mining firms and these depend on mineral prices
- 2) Should be uncorrelated with the error term since mineral prices are determined in the international market and are thus exogenous to Peruvian districts' level of education and income

Thank you!

# Distribution of the Mining Canon for the years 2007 and 2008 (in millions of soles)



# Unsatisfied Basic Needs Indicator (UBN)

- The UBN is composed of the following indicators:
  - 1) Homes with inappropriate physical characteristics (floor, wall and roof materials such as mud, straw,...)
  - 2) Overcrowded houses ( 3 or more people per room)
  - 3) Homes without waste pipes
  - 4) Homes with a least one child that is in school age that is not going to school
  - 5) Homes with high pressure or economic dependence (HH head has not finished elementary school and has 3 or more people per income earner)
- The indicator is a number between 0 and 1 and reflects the percentage of the population or homes that have one or more unsatisfied needs.
- The higher the UBN, the poorer the district.