CENTER FOR REGIONAL ECONOMICS AND POLICY
UNIVERSIDAD ADOLFO IBÁÑEZ

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ESCUELA DE NEGOCIOS

Impact Analysis of Copper Price Super Cycle on Chilean Growth

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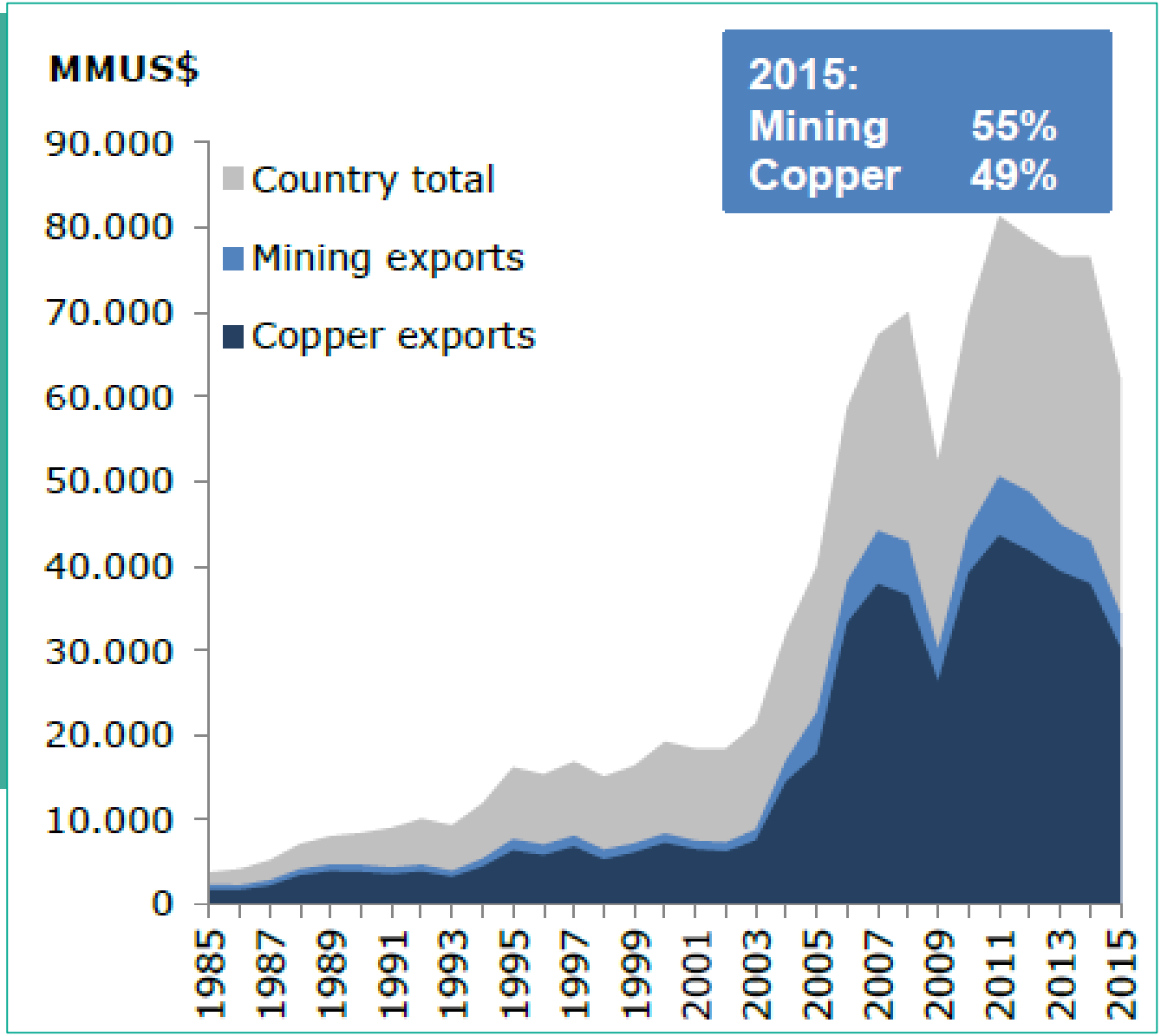
- CEPR, Business School, Universidad Adolfo Ibáñez, Viña del Mar, Chile

Motivation

- The importance of copper production in Chilean Economy
- There was a significant growth of copper production previous to the copper price super cycle
- During the copper supper cycle the copper production did not growth significantly.

The importance of copper production on Exports



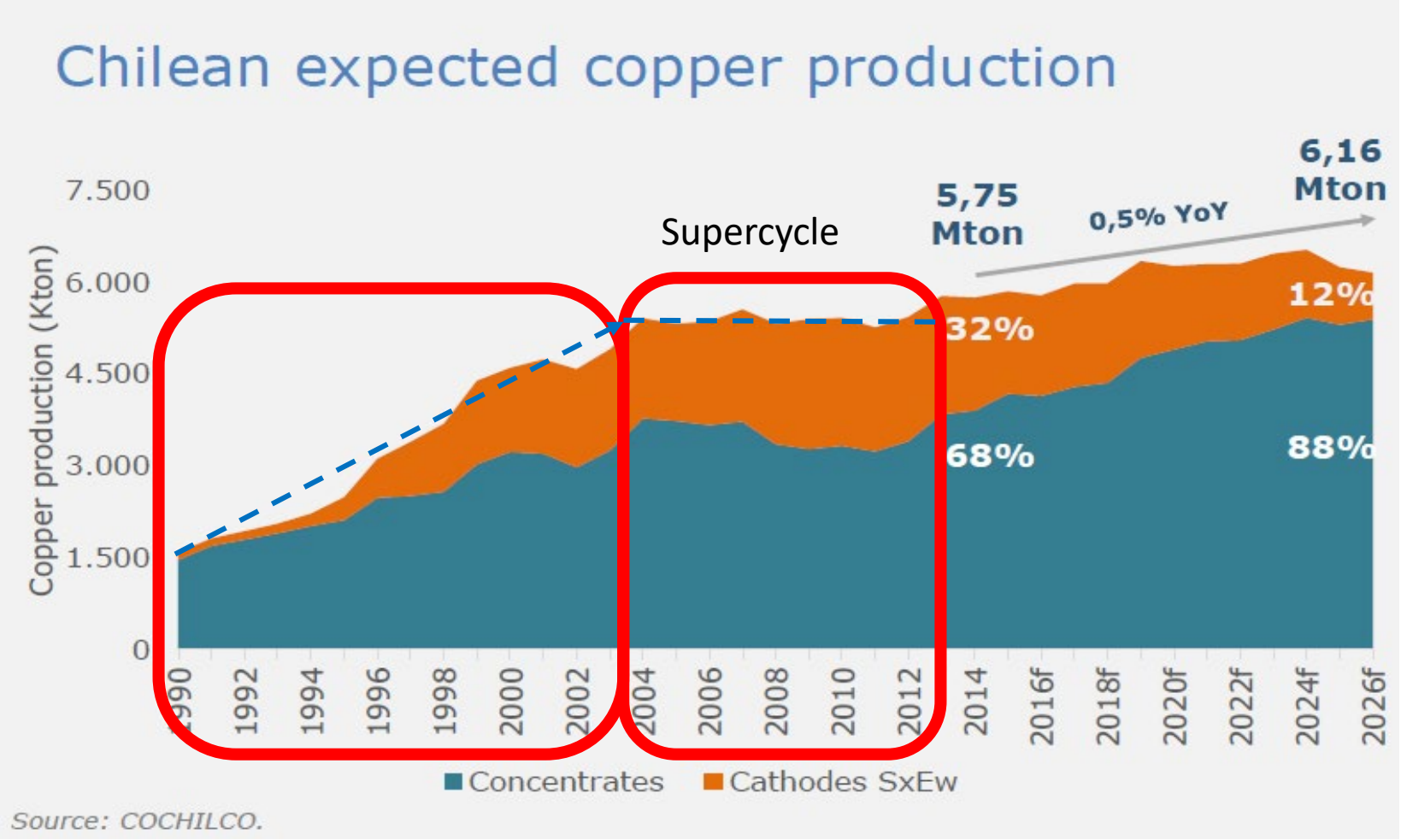
IO Table

Transactions in Monetary Terms

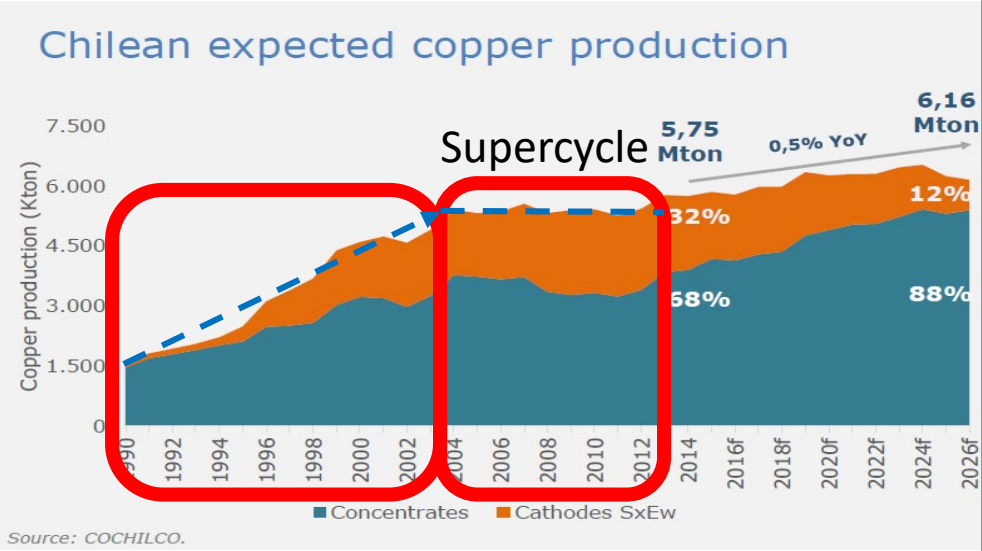
	Sectors						
Sectors	1	$\cdots$	j	$\cdots$	n	Final Demand	Total Output
1	z_{11}	$\cdots$	z_{1j}	$\cdots$	z_{1n}	f_1	x_1
2	z_{21}	$\cdots$	z_{2j}	$\cdots$	z_{2n}	f_2	x_2
$\vdots$	$\vdots$		$\vdots$		$\vdots$	$\vdots$	$\vdots$
n	z_{n1}	$\cdots$	z_{nj}	$\cdots$	z_{nn}	f_n	x_n
Added Val.	v_1	$\cdots$	v_j	$\cdots$	v_n	f_{n+1}	x_{n+1}

Copper Price

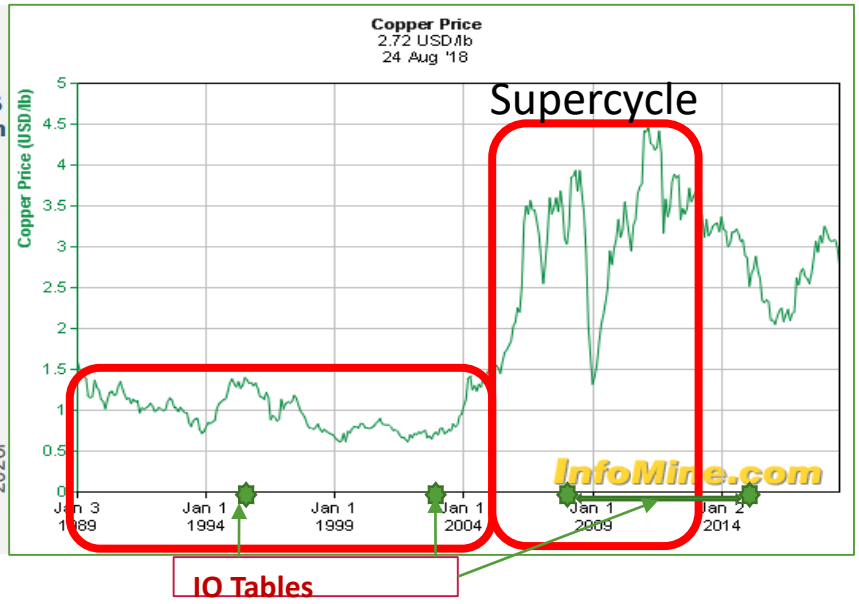
Copper Production



Copper Production and Price

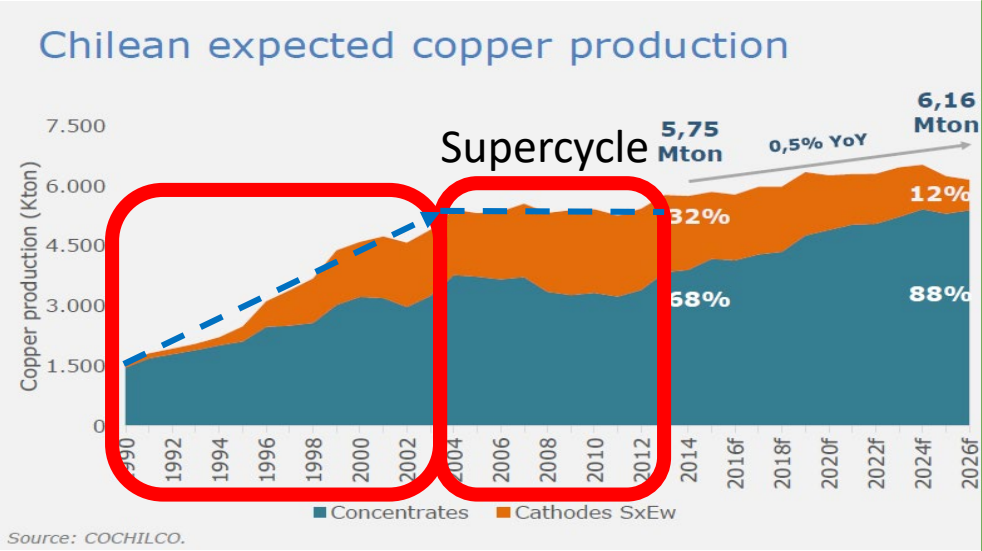


$\Delta x > 0$ $\Delta x = 0$

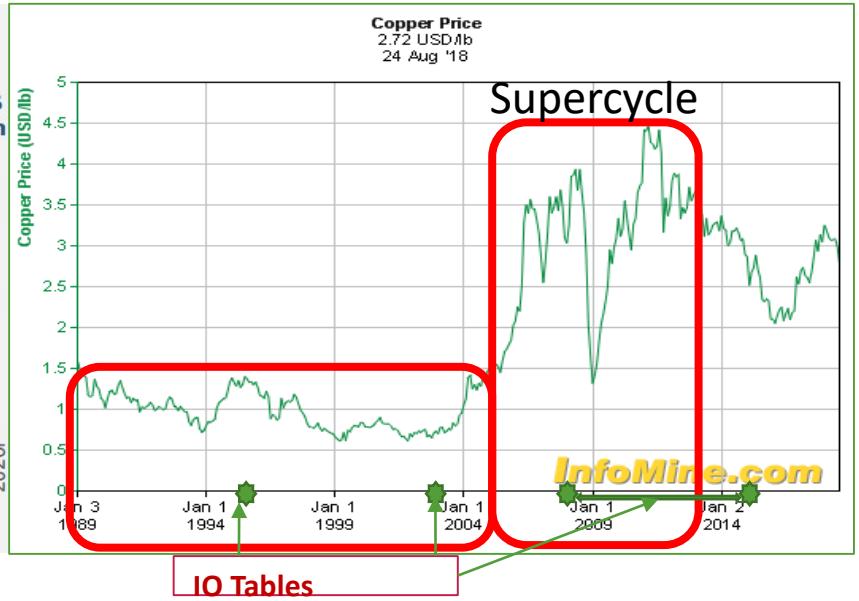


$\Delta p = 0$ $\Delta p > 0$

Copper Production and Price



$\Delta x > 0$



$\Delta p = 0$

Methodology

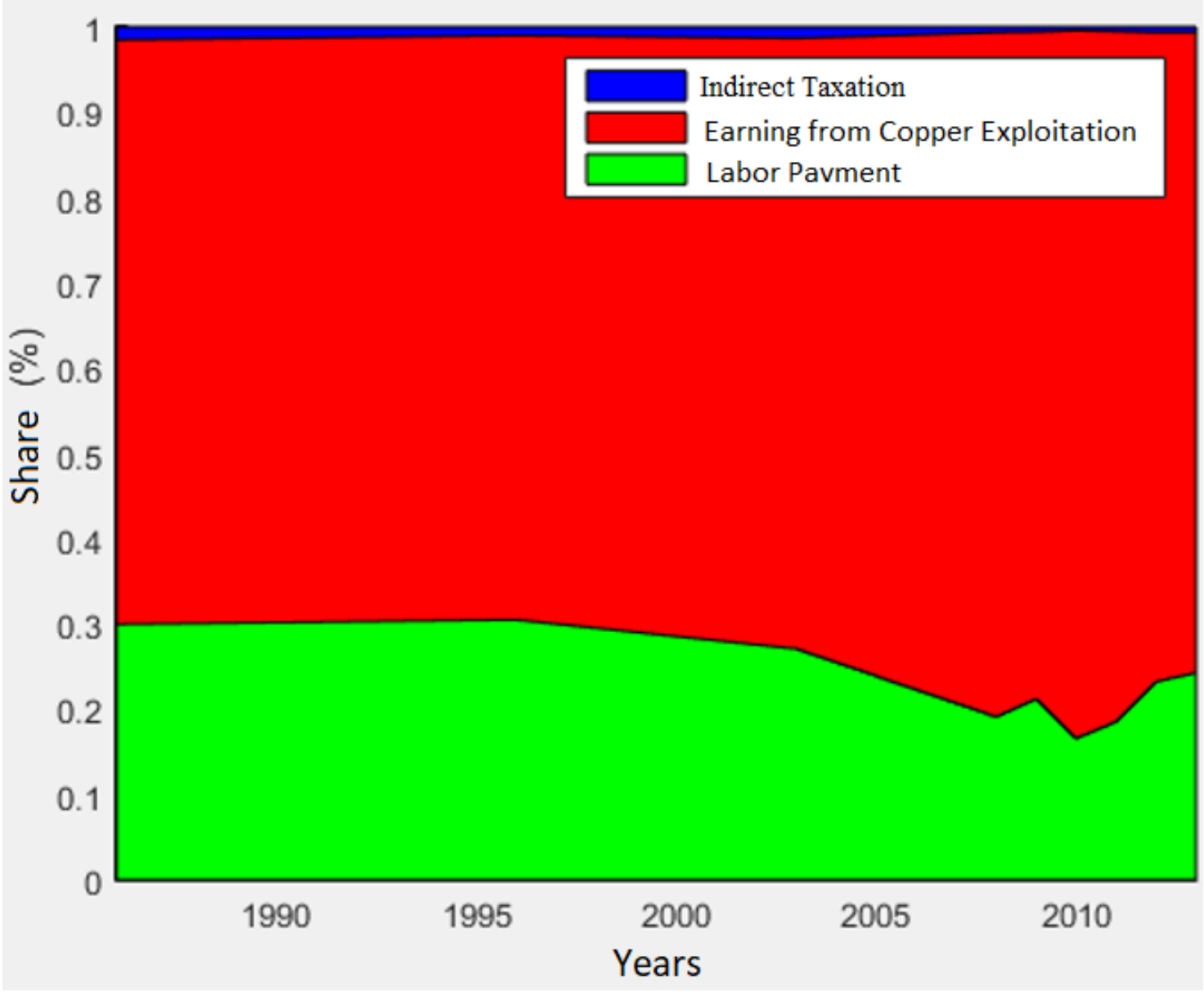
- How to measure the impact?
  - Leontief model from Miller and Blair (2009)

Leontief Quantity Model (Demand-pull) [Prices fixed; quantities change]	Exogenous Variables	$\mathbf{f}^1 = [f_i^1]$ or $\Delta\mathbf{f} = [\Delta f_i]$
	Endogenous Variables	$\mathbf{x}^1 = \mathbf{L}^0\mathbf{f}^1$ or $\Delta\mathbf{x} = \mathbf{L}^0(\Delta\mathbf{f})$

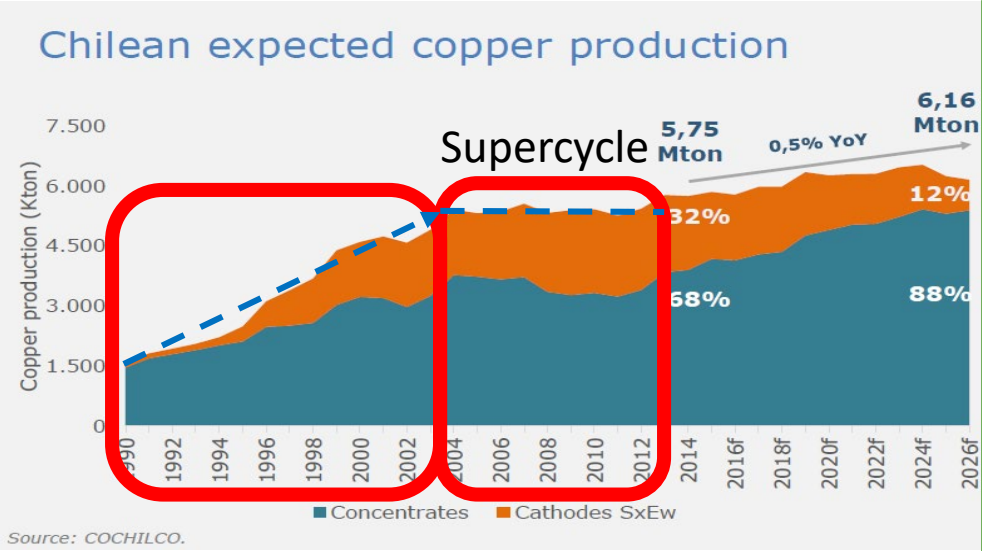
Variation in Exports

$$\Delta production = \Delta\mathbf{f}$$

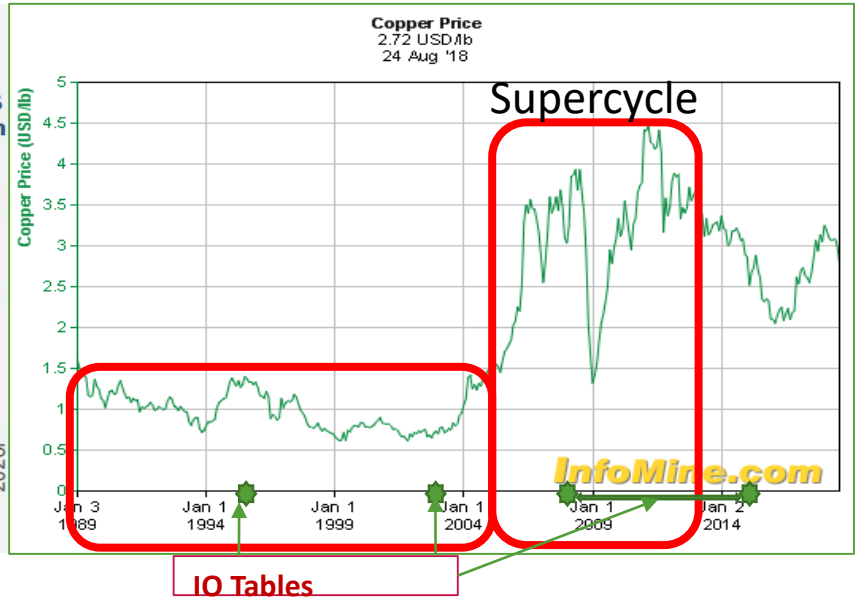
VA Distribution => $\Delta f > 0$



Copper Production and Price



$$\Delta x = 0$$



$$\Delta p > 0$$

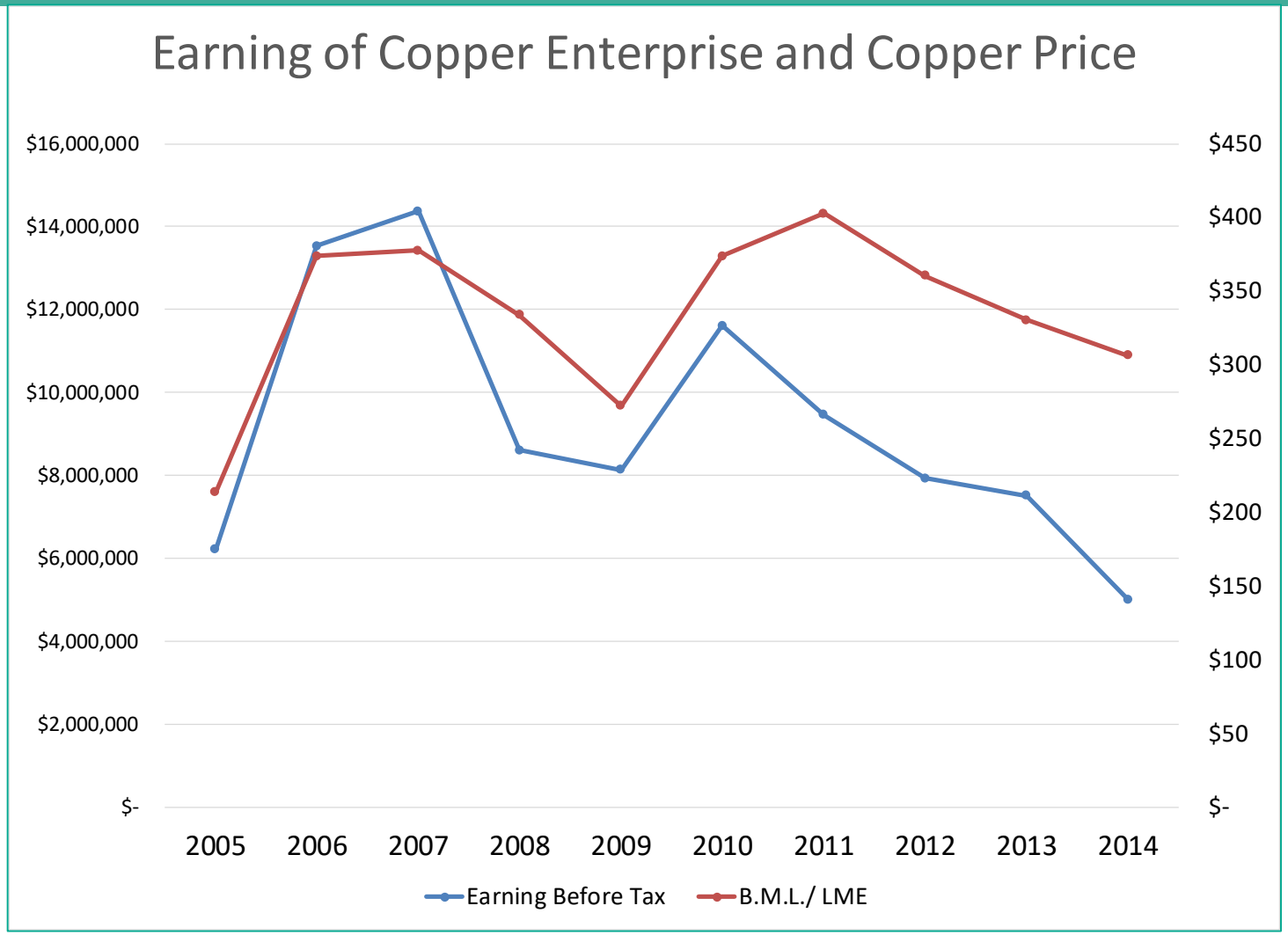
IO Methodology

- How to measure the impact of price changes?
  - Leontief model from Miller and Blair (2009)

Leontief Price Model (Cost-push) [Quantities fixed; prices change]	Exogenous Variables	$\mathbf{v}_c^1 = (\hat{\mathbf{x}}^0)^{-1}\mathbf{v}^1 = [v_j^1/x_j^0]$ or $\Delta\mathbf{v}_c = (\hat{\mathbf{x}}^0)^{-1}(\Delta\mathbf{v}) = [\Delta v_j/x_j^0]$
	Endogenous Variables	$\tilde{\mathbf{p}}^1 = (\mathbf{L}^0)'\mathbf{v}_c^1$ or $\Delta\tilde{\mathbf{p}} = (\mathbf{L}^0)'(\Delta\mathbf{v}_c)$

$$\Delta price = \Delta \mathbf{v}$$

Change in Copper Price and Earnings



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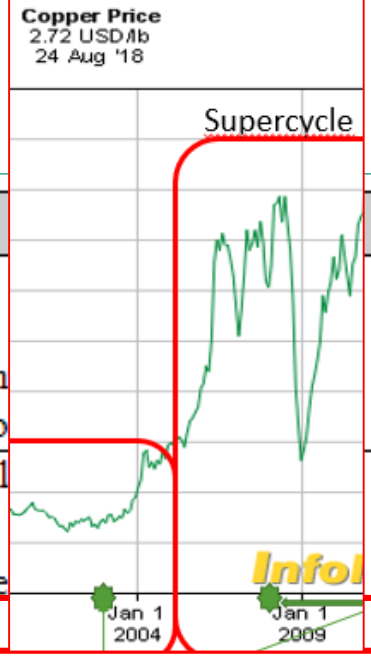
Estados Financieros 2007



	2007	2006	2005
Operating revenues:			
Sales	9,843,344	8,073,540	3,887,684
Refining and treatmen	(626,715)	(762,021)	(390,654)
Concentrate and catho	(196,036)	(149,716)	(117,264)
Net sal	9,020,593	7,161,803	3,379,766
Operating costs and expense			
Cost of products sold	(1,408,227)	(1,179,954)	(997,519)
Sales commissions	(27,621)	(14,209)	(8,703)
Net operating income	7,584,745	5,967,640	2,373,544
Non-operating income (expense):			
Interest income	11,748	10,500	5,245
Interest expense	(113,792)	(57,391)	(68,550)
Realized fair value change – derivative	(89,280)	(188,086)	-
Unrealized fair value change – derivative	61,801	(95,746)	-
Exchange loss, net	(6,635)	(14,270)	(16,063)
Miscellaneous expenses, net	(69,399)	(54,588)	(48,089)
Non-operating expense	(205,557)	(399,581)	(127,457)
Income before income taxes	7,379,188	5,568,059	2,246,087
Income taxes	(1,376,483)	(1,027,534)	(385,101)
Net income for the year	6,002,705	4,540,525	1,860,986

Policy Implications

- Chilean case (cooper):
  - Exploitation concession for 99 years
  - The firm get all the extraordinary profits of a super price cycle
  - The country get some additional tax on profits, however the share is not big.

- Ecuadorian case (oil):
  - The agree an exploitation price with the firms
  - If the price goes up, the country get the extraordinary earning
  - If price goes under the agreement price, the country has to pay the difference.

Conclusions and Challenges

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