

Contagion Analysis:  
**CAR WASH OPERATION**





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## POLICY QUESTION

Possible impacts on the financial system  
in case of companies' default involved in  
Car Wash Operation, including supplier  
contagion and employment effects





## POLICY QUESTION

Possible impacts on the financial system  
in case of **companies'** default involved in  
Car Wash Operation, including supplier  
contagion and employment effects

not only engineering  
companies, but all their  
respective economic groups



Contagion Analysis:

**CAR WASH OPERATION**

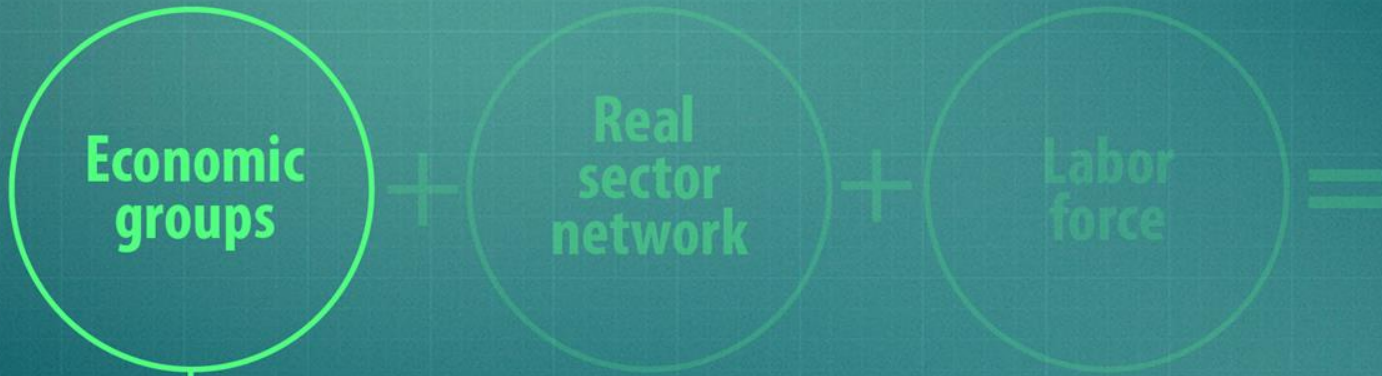
# THE CONTAGION FRAMEWORK



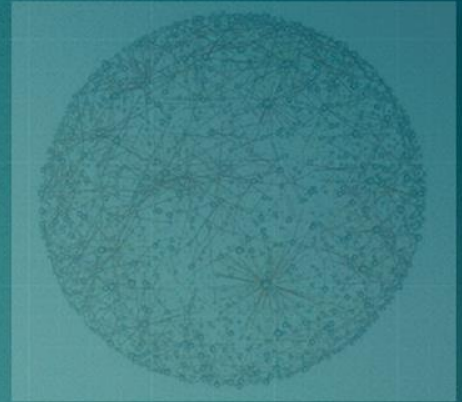


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# THE CONTAGION FRAMEWORK



"Real" real sector network



Information from banks

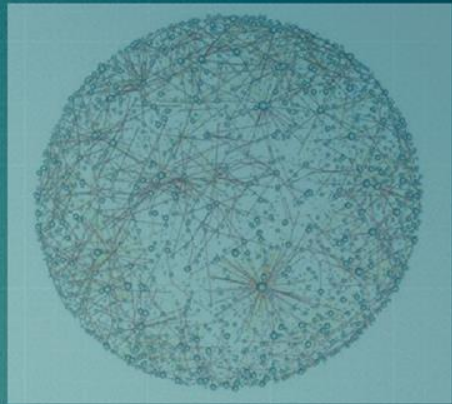
Ownership data

Public info

Contagion Analysis:  
**CAR WASH OPERATION**  
**THE CONTAGION  
FRAMEWORK**



“Real” real sector network



Flow of funds used to measure the importance of a counterparty to the entire business of an economic group

$$\text{The importance of company Z to the business of company Y} = \frac{\text{flow from firm Z to firm Y}}{\text{total flows to firm Y}}$$



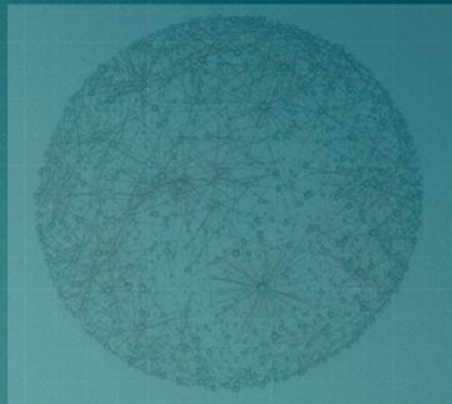


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# THE CONTAGION FRAMEWORK



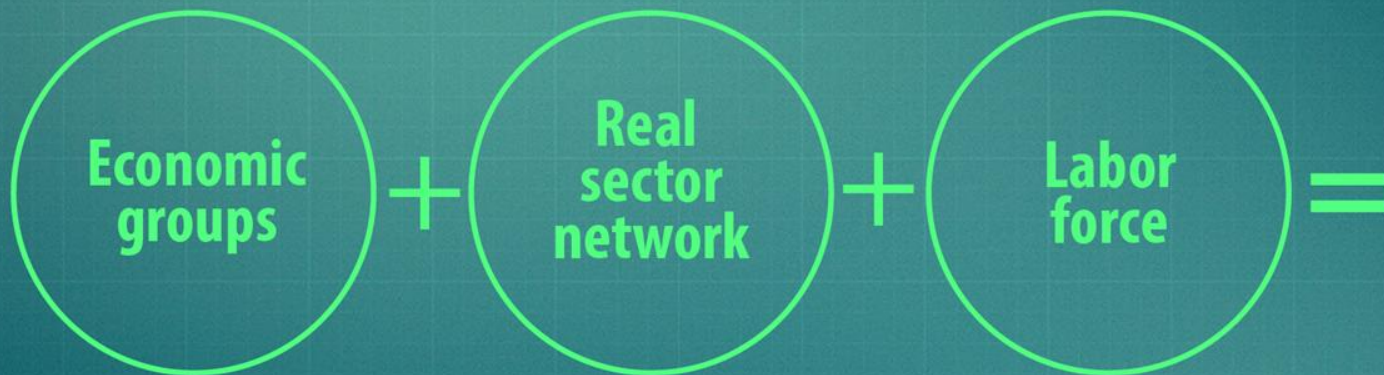
"Real" real sector network



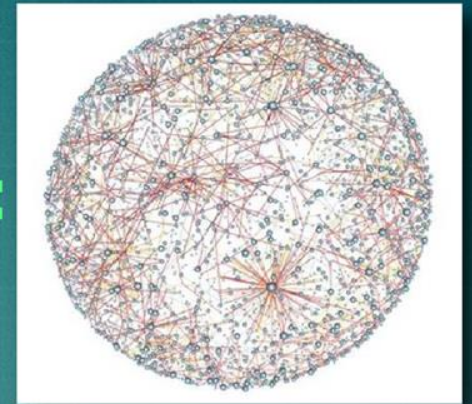
Ministry  
of Labor

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# THE CONTAGION FRAMEWORK



**"Real" real sector network**





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**THE CONTAGION  
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All FIs participations  
in other FIs must  
be approved by  
the Central Bank

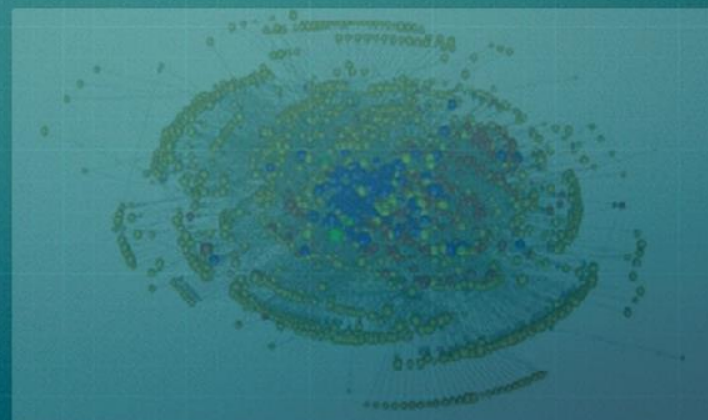
**Financial  
conglomerates**

+

**Financial  
sector  
network**

=

**"Real" financial sector network**





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# THE CONTAGION FRAMEWORK

All financial instruments issued or held by FIs must be registered in clearing houses or register centers

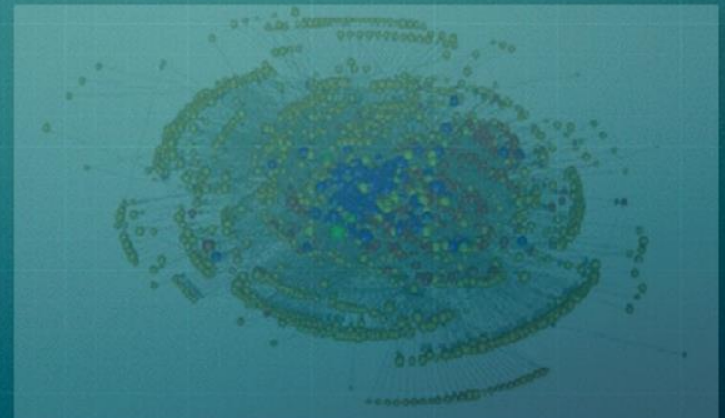


+



=

"Real" financial sector network

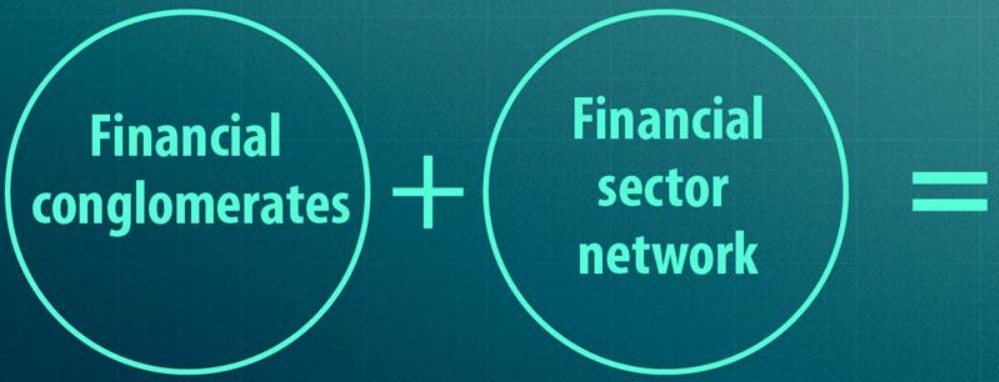
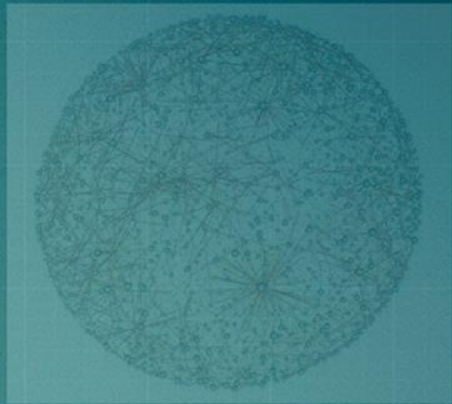




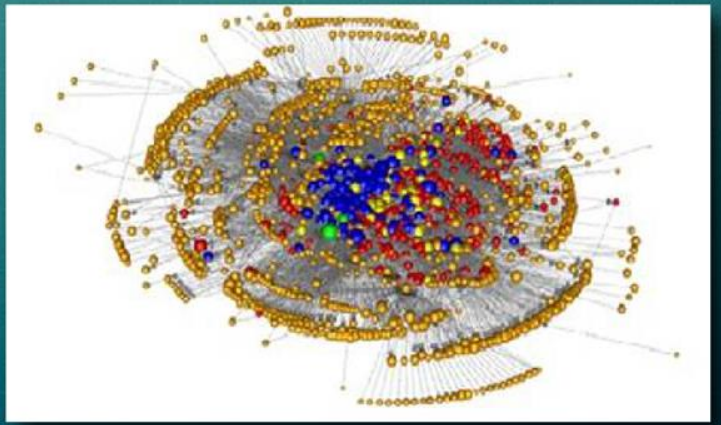
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**THE CONTAGION  
FRAMEWORK**



"Real" real sector network



"Real" financial sector network



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# THE CONTAGION FRAMEWORK

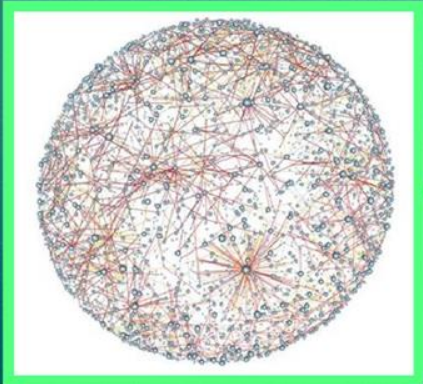
## REAL SECTOR EXPOSURE TO THE FINANCIAL SYSTEM

EXPOSURES	SOURCE
CREDIT TRANSACTIONS	Credit Register (Central Bank of Brazil)
FUNDING INSTRUMENTS	Clearings (BM&Fbovespa / CETIP)
DERIVATIVES INCLUDING OTC	Clearings (BM&Fbovespa / CETIP)
FX	Central Bank of Brazil
EQUITY	Clearings (BM&FBovespa / CBLC)

Exposures are measured net of collaterals



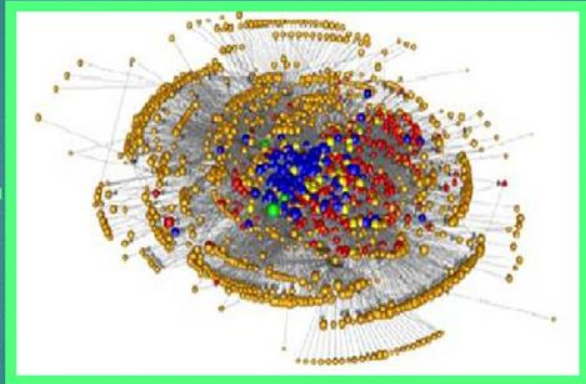
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**THE CONTAGION  
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“Real” real sector network

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**REAL SECTOR EXPOSURE  
 TO THE FINANCIAL SYSTEM**



“Real” financial sector network





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## THE CONTAGION FRAMEWORK

- Economic Group(s) of interest were considered in default causing losses to other economic groups.
- The contagion proceeds until the network is stable again and no more defaults occur.
- The output of the contagion process was a set of economic groups that went bankrupt.
- From the set of failed economic groups, we could map the following:
  - a) financial system exposures to those firms.
  - b) financial system exposures to the workforce employed at those firms.





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**IMPACTS**

## ECONOMIC GROUPS

PETROBRÁS  
and  
ENGINEERING  
COMPANIES



**1st**  
level

IMPACTED  
SUPPLIERS



**2nd**  
level



## ECONOMIC GROUPS

PETROBRÁS  
and  
ENGINEERING  
COMPANIES



**1st**  
level

**30**  
vulnerable  
groups including  
**447** companies

IMPACTED  
SUPPLIERS



**2nd**  
level

Contagion chain through  
payment dependency

**51k** affected companies  
in the network of 313 k

# ECONOMIC GROUPS

PETROBRÁS  
and  
ENGINEERING  
COMPANIES



**1st**  
level

IMPACTED  
SUPPLIERS



**2nd**  
level

Unemployment



**5,2** million  
identified employees



# ECONOMIC GROUPS

Direct Impact

# NATIONAL FINANCIAL SYSTEM

PETROBRÁS  
and  
ENGINEERING  
COMPANIES

IMPACTED  
SUPPLIERS

FINANCIAL  
CONTAGION !

1st  
level

2nd  
level

3rd  
level

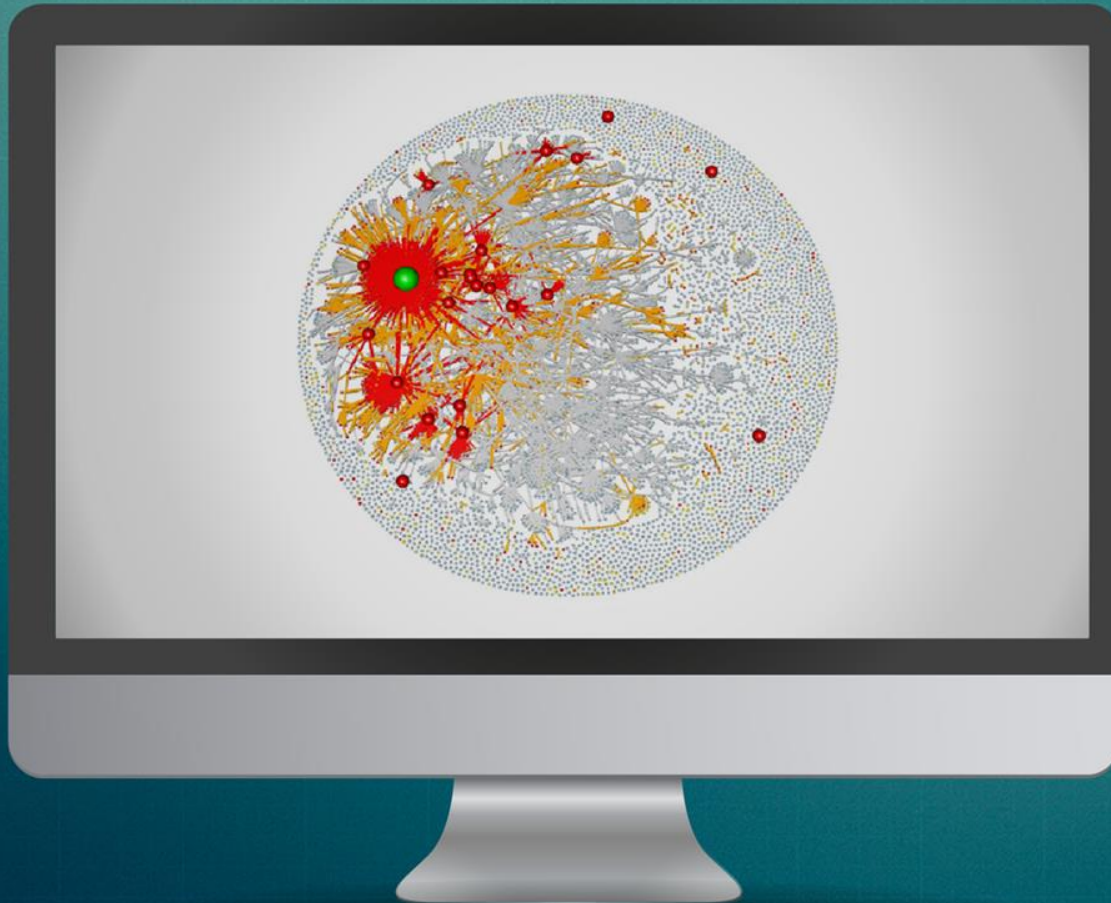
Unemployment

5,2 million  
identified employees

Direct  
Impact



# Contagion Analysis: CAR WASH OPERATION IMPACTS



- Defaulted Company
- First Round Defaults
- Second Round Defaults
- Other Rounds Defaults
- Not Defaulted





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**RESULTS**



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CAR WASH OPERATION

# RESULTS

Jun/15

**R\$130 mi**  
CAPITAL NEEDS  
for vulnerable companies

**R\$3.4 bi**  
CAPITAL NEEDS  
for all companies





Contagion Analysis:  
CAR WASH OPERATION

# RESULTS

Jun/15

**R\$ 130 mi**  
CAPITAL NEEDS  
for vulnerable companies

**0%**

OF REGULATORY  
CAPITAL

**R\$ 3.4 bi**  
CAPITAL NEEDS  
for all companies

**0.4%**

OF REGULATORY  
CAPITAL

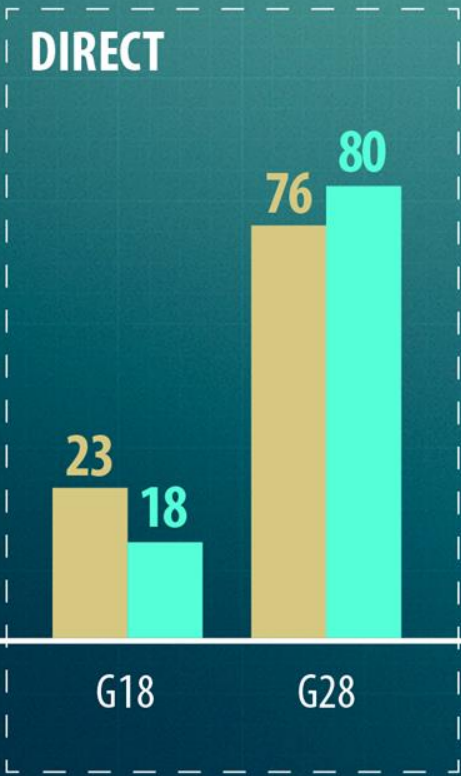


Contagion Analysis:  
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# RESULTS

## NET EXPOSURE (R\$ BI)

- Dec/14
- Jun/16







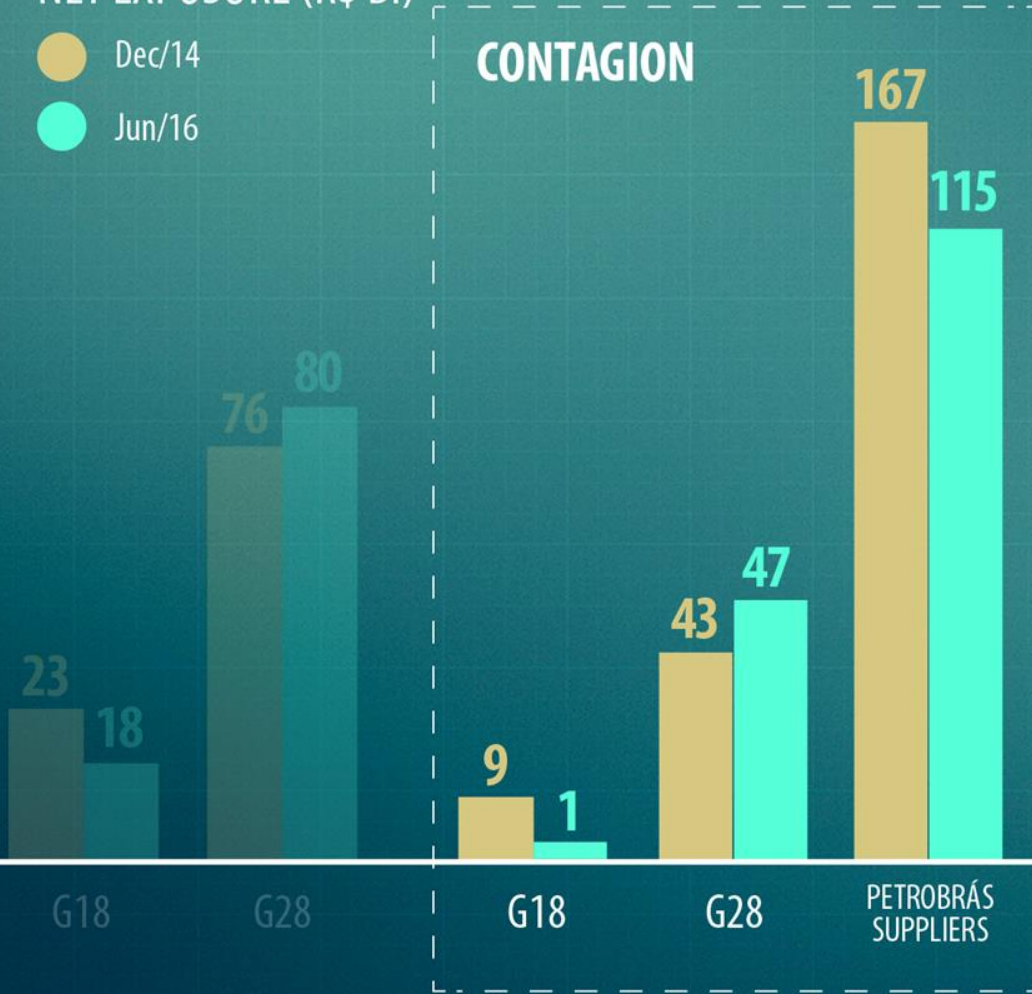
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# RESULTS

## NET EXPOSURE (R\$ BI)

- Dec/14
- Jun/16

### CONTAGION





Contagion Analysis:  
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# RESULTS

NET EXPOSURE (R\$ BI)

- Dec/14
- Jun/16

