

The Few Leading the Many: Foreign Affiliates and Business Cycle Comovement

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- 3 Stylized facts
- 4 Econometric form
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- 6 Focus on vertical linkages
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MNEs and BCC : Motivation

- **A few firms** - the largest ones - are responsible for a non negligible part of **aggregate fluctuations**

[Gabaix'10, diGiovanni Levchenko'11-Méjean'12, Eaton Kortum Sotelo'12]

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⇒ Many among these large firms belong to multinational companies

- MNEs share strong **parent-affiliate linkages**
- Two large firms in two countries can co-move → same company

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Research question

Do MNEs give rise to **aggregate co-fluctuations**?

MNEs and BCC : Mechanism

Shock in a country, affiliate in another : 2 conditions for aggregate comovement

① Micro comovement (parent-affiliate) which depends on...

- type of **shocks** : demand/supply, global/local...
- ... and type of **linkages** : vertical or horizontal (intrafirm trade, transfer of intangible inputs (Atalay'12))

⇒ supply shocks → transmission likely

⇒ demand shocks → transmission likely if vertical linkages

② Transmission micro shock → aggregate, which happens if...

- many affiliates face the same shock or **affiliates sufficiently large**

⇒ second option reminiscent to Gabaix'10

MNEs and BCC : Our paper

- ① New data set for French regions : macro info. on BCC and micro info. on the ownership/**nationality** and activities of firms
- ② Document new facts
 - ⇒ massive intrafirm trade between foreign affiliates and parents
 - ⇒ affiliates large enough to impact aggregate eco. outcomes of their region
- ③ Exploit the heterogeneity in BCC between French regions and countries, and the regional heterogeneity in foreign affiliates presence to show
 - ⇒ positive **impact of foreign affiliates on BCC**
 - ⇒ effect goes beyond the bilateral trade influence
 - ⇒ mostly through parent-affiliates **vertical linkages**

MNEs and BCC : Contributions

- Large firms are different
[Moscarini Postel-Vinay'09, Goldberg Hellerstein'11, Neary'09, Parenti'12]
⇒ also differ in terms of ownership structure and nationality
- Determinants of BCC : trade, IO linkages, industry similarity, distance
[Frankel Rose'97, Baxter Kouparitsas'05, Imbs'04, Clark van Wincoop'01 ...]
⇒ importance of foreign affiliates for BCC
⇒ data to follow best practices in the literature
- Role of outsourcing and role of a few firms for BCC
[Burstein et al.'08, Johnson'12]
⇒ more precise data, **role of intrafirm trade** by foreign affiliates
⇒ confirm and go beyond Johnson's suggestion

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Dataset : Micro grounds

- Data intensive question
- ⇒ Combine 5 micro-datasets for France...
- Balance sheet (BRN) : employment, value-added, sales
 - Ownership (LIFI)
 - Trade information (Custom data)
 - Intra-firm trade (EIIG survey '99)
 - Location of plants (STOJAN)
- France alone is not enough
- ⇒ Look at each of the 21 French regions...

Dataset

- Aggregate micro information and merge with macro data
- ⇒ New dataset for a cross section of 21 French regions - 162 countries
- Macro charact. of region-country pairs : **BC correlation** (90-06), **bilateral trade**
 - Macro characteristics of regions and countries : GDPs, total trade, employment, **similarity of industry structure** (INSEE, World Bank, DOTS)
 - Micro characteristics of French regions : **presence of foreign affiliates** (employment and value added) and **their nationality, intrafirm trade**

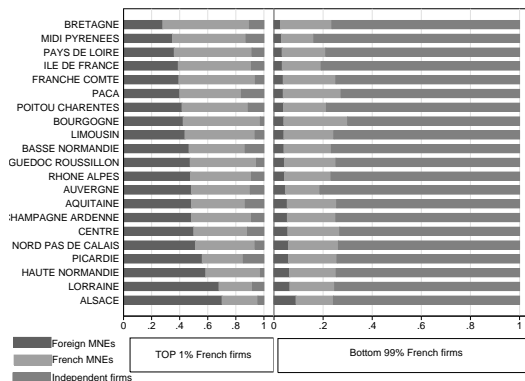
Final database, an example

- BCC between Basse-Normandie and Germany (computed between 1990-2006)
- Level of bilateral trade between BN and G (for a given year, 99-06)
- Share of intra-firm trade (1999)
- Share of trade and intrafirm trade made up by German affiliates
- Importance of German affiliates in Basse-Normandie (employment, value added) (for a given year, 99-06)
- Measure of intra-industry trade
- Measure of similarity in production structure / specialization

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1 - The Few Leading the Many? Distribution of FA



In French regions, foreign affiliates \approx

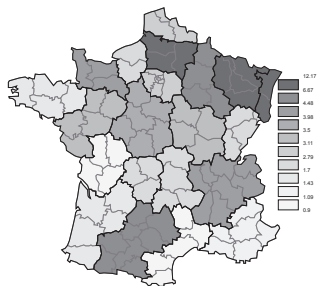
5% of the total # of firms, 1/4 of employment, 1/3 of VA, 1/2 of trade

2 - Strong linkages parents - affiliates

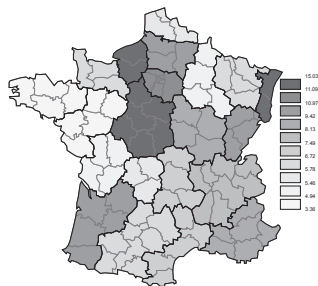
- Foreign affiliates if another firm owns **more than 50%** of voting shares
 - ⇒ **Median voting share : 99%**
- Foreign affiliates trade a lot with their parent country, **mostly intrafirm**
 - ⇒ At 75% intrafirm trade
 - $\approx 40\%$ of French MNEs' trade - 50% of FA trade to other dest. is intrafirm
 - Example : FA in Alsace, 84% of exports to their parent country is intrafirm.
Midi Pyrénées : 95%

3 - Uneven geographical distribution of foreign affiliates

⇒ heterogeneity is key for our identification



from Germany



from the US

4 - Different BCC between French regions and countries

Germany			
3 Highest		3 Lowest	
Alsace	0.39	Languedoc-Roussillon	-0.138
Lorraine	0.36	Île-de-France	-0.21
Picardie	0.35	Auvergne	-0.29
USA			
3 Highest		3 Lowest	
Île-de-France	0.36	Centre	-0.30
Aquitaine	0.20	Picardie	-0.31
Bretagne	0.18	Nord-Pas-de-Calais	-0.32

This table displays the 3 lowest and 3 highest level of correlation of business cycle between French regions and 6 selected countries. Business cycle correlation is computed as the correlation of GDP growth of French regions and foreign countries. Regional GDP data are from the INSEE. Country GDP are USD GDP from IFS, converted to Euro using Compustat data.

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Econometric form

$$\rho_{cr} = \alpha FME_{cr} + X_{cr}\beta + \nu_r + \nu_c + \epsilon_{cr}$$

- ρ_{cr} : BCC of region r and country c
 - FME_{cr} : presence of affiliates from c in r
 - ν_c and ν_r : country and region fixed effects
- ⇒ account for aggregate shocks, endowments (specialization, foreign affiliates), BC of c with France, BC of r with the world etc...
- X_{cr} : other determinants (trade, distance, similarity of production structure...)

Main variables

- Business cycle correlation : correlation of GDP growth rates
- Foreign affiliates presence : share of foreign affiliates from a given country in total employment or in GDP of the region
- Bilateral trade : total trade between c and r , normalized by GDPs
- Intra-industry trade : Grubel Lloyd index
- (dis-) Similarity of specialization (industry k)

$$DISIM_{cr} = \sum_k |s_{ck} - s_{rk}|$$

with s_{ck} the share of sector k in total exports of country c

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Main result : 10% ↗ in FME → 0.5% ↗ in BCC

<i>Dep. variable : ρ_{cr} = Correlation of growth rate of GDPs</i>				
	(1)	(2)	(3)	(4)
$FME_{cr}(Empl.)$	12.72*** (4.053)		11.01*** (3.431)	11.39*** (3.509)
BT_{cr}		20.42*** (2.680)	15.36* (1.951)	11.45 (1.508)
IIT_{cr}				0.06 (1.345)
$DISIM_{cr}$				-0.06*** (-4.460)
Region FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Observations	3,402	3,402	3,402	3,329
R^2	0.691	0.690	0.691	0.695

Results hold when :

- Controlling for common border and distance
- Measuring BCC from HP-filtered GDPs
- Focusing on countries that invest in at least one French region
- Measuring foreign affiliates presence through value added
- Measuring similarity of production structure (services - agriculture - industry)
- Measuring foreign presence in years 1999, 2000,..., 2006
- Random assignment of FME across regions : not significant coef. on FME as expected

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Vertical linkages

Why?

- ① Better understand the mechanisms
- ② Deal with reverse causality

Two measures of verticality

- ① Keep **for. affiliates operating in different industries as their parents**
 - Pro : vertical linkages only \Rightarrow Ramondo Rappoport Rhul'11 : horizontal FDI may be explained by BCC
 - Cons : not all vertical linkages \Rightarrow Alfaro Charlton'10 : intra-industry vertical FDI
- ② Importance of intrafirm exports to the parents (cf. Antras' papers)
 - Intensity measured as intrafirm exports by foreign affiliates in the region to their country of origin over bilateral trade

Vertical linkages

	Dep. variable : ρ_{cr} = Correlation of growth rate of GDPs				
	(1)	(2)	(3)	(4)	(5)
FME_{cr} vertical (Empl.)	35.26*** (2.591)				
IF_{cr}		0.56** (2.389)	0.54** (2.329)	0.41* (1.783)	0.39* (1.69)
Out_{cr}			9.33 (0.647)		8.94 (0.559)
BT_{cr}	13.97* (1.943)	4.78 (0.552)	4.78 (0.555)	6.41 (0.730)	6.42 (0.740)
IIT_{cr}	0.06 (1.325)	0.07 (1.568)	0.07 (1.568)	0.07 (1.598)	0.069 (1.599)
$DISIM_{cr}$	-0.06*** (-4.325)	-0.06*** (-4.665)	-0.06*** (-4.672)	-0.06*** (-4.699)	-0.06*** (-4.700)
Sample	Full	Full	Full	Input	Input
Country FE	Yes	Yes	Yes	Yes	Yes
Observations	3,329	3,276	3,276	3,234	3,234
R^2	0.695	0.694	0.694	0.695	0.695

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- **Foreign affiliates are large firms** : they may affect aggregate fluctuations of their host region
- They have strong linkages with their parent country : transmission of shocks and **co-fluctuations**
- Policy : **origin of FA matters** → **diversification**

THANK YOU FOR YOUR ATTENTION!

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1 bis - Important contribution of the few foreign affiliates

	# firms			Emp.		VA		EXP		IMP	
	IND	MNE	FME	MNE	FME	MNE	FME	MNE	FME	MNE	FME
Alsace	75.5	14.4	10.1	29.9	38.5	29.9	51.1	21.4	69.8	14.2	76.7
B.-Normandie	74.1	21.5	4.5	42.6	18.2	46.7	25.8	36.0	50.4	31.6	54.7
Ile-de-France	81.1	13.9	5.1	42.2	23.8	44.3	36.3	46.3	39.3	31.4	59.1
Midi Pyrénées	79.5	16.6	3.9	37.3	19.8	32.2	39.0	19.4	54.9	19.5	58.5
Nord PdC	74.4	19.2	6.4	43.6	23.5	43.9	36.2	42.0	49.8	34.9	52.3
Rhône Alpes	77.6	17.6	4.8	41.7	22.2	44.9	30.6	44.7	41.5	35.7	50.7
w. ave	77.6	17.2	5.2	41.6	22.7	43.9	33.5	40.5	46.7	32.1	56.4

This table displays the percentage contribution of independent French firms (IND), French multinational firms (MNE), and foreign multinational firms (FMEs) to the economic activities of French regions in the manufacturing industry. *Employ.* stands for employment. Figures by regions are averages over the period 1999-2004. The averages are the weighted mean of regional values. Weights reflect the importance of each region for each outcome (their weight in France's total value added, France's total employment etc.). Figures are based on authors' computations from 4 datasets : BRN, STOJAN, LIFI, and the French custom data. Sales, exports, and imports are expressed in current Euro. The row "Average" is the simple arithmetic average of regional contributions.

2 bis - Foreign affiliates linkages - Share of intrafirm trade

Partner	MNE		FME		FME	
	All partners		All partners		Country ownership	
	Exports	Imports	Exports	Imports	Exports	Imports
ALSACE	0.45	0.31	0.58	0.61	0.84	0.73
BASSE NORMANDIE	0.49	0.36	0.57	0.55	0.86	0.47
ILE DE FRANCE	0.53	0.18	0.65	0.65	0.89	0.85
MIDI PYRENEES	0.35	0.24	0.79	0.39	0.95	0.57
NORD PAS DE CALAIS	0.29	0.36	0.59	0.52	0.76	0.75
RHONE ALPES	0.54	0.26	0.65	0.46	0.63	0.66
Average	0.47	0.28	0.47	0.55	0.78	0.73

To illustrate : in Alsace, 58% of exports done by FME is intra-firm. And 84% of exports by FME to their country of ownership is intra-firm. Notice that in the data, exports to their countries of ownership account for respectively 13.6% and 25.7% of total exports and imports of foreign multinationals.