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Ercole, Roberto

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THE CONCENTRATION OF MANUFACTURING INDUSTRIES IN VIETNAM WITH PARTICULAR REFERENCE TO HO CHI MINH CITY AND ITS SURROUNDING

*Regional Science Association International - British and Irish Section (RSAI-BIS)
42nd Annual Conference, Sidney Sussex College, University of Cambridge
21st – 22nd August, 2013*

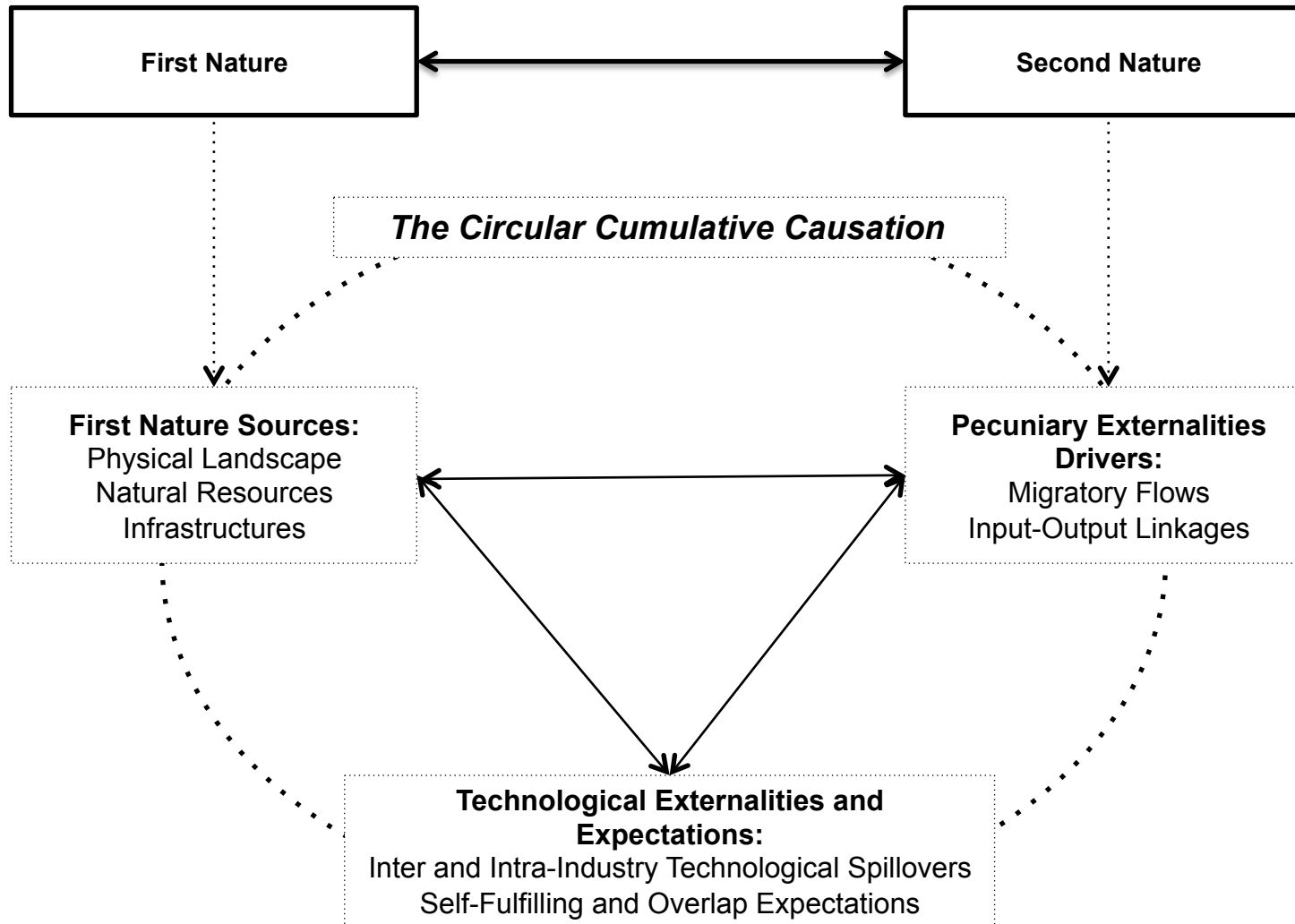
Roberto Ercole
University of Huddersfield
roberto.ercole@hud.ac.uk

Motivations and Aims of Study

- Vietnam is one of the most dynamic emerging countries in the South-East Asia in terms of economic growth. Despite this, there is little academic attention to its economic geography, and in particular with reference to the country's agglomeration and industrial concentration.
- The research aims to investigate the economic agglomeration and concentration of manufacturing industries in Vietnam with particular reference to Ho Chi Minh and its surrounding provinces using a-spatial and spatial statistics.

**THEORETICAL FRAMEWORK
AND METHODOLOGY:
THE ECONOMIC COLOCALIZATION FORCES,
DISCRETE AND SPATIAL STATISTICS**

The Determinants of Colocalization and Delocalization Forces



A-spatial Statistics

Location quotient (LQ) in order to measure the relative industrial specialization:

$$LQ_{r,i} = \frac{E_{r,i} / \sum_{i=1}^N E_{r,i}}{\sum_{r=1}^R E_{r,i} / \sum_{i=1}^N \sum_{r=1}^R E_{r,i}}$$

Locational Gini index to measure the relative industrial concentration of employment (Kim 2000):

$$Gini_r = \frac{\Delta}{4\bar{x}}$$

where:

$$\Delta = \frac{1}{N(N-1)} \sum_{i=1}^N \sum_{j=1}^N |x_i - x_j|$$

where:

E= employment

r= two-digit sector

i=location

N= number of observations.

$x_{i(j)} = LQ_{r,i(j)}$

\bar{x} = mean of x

Spatial Autocorrelation

Global Moran's I in order to measure spatial autocorrelation
(Moran, 1948, 1950):

$$I = \frac{\sum_{i=1}^N \sum_{j=1}^N w_{ij} (x_i - \bar{x})(x_j - \bar{x})}{\sum_{i=1}^N (x_i - \bar{x})^2}$$

The **local Moran's I** of spatial local association (Anselin, 1995):

$$I_i = \left(\frac{x_i - \bar{x}}{\sum_{i=1}^N \frac{(x_i - \bar{x})^2}{N}} \right) \sum_{j=1}^N w_{ij} (x_j - \bar{x})$$

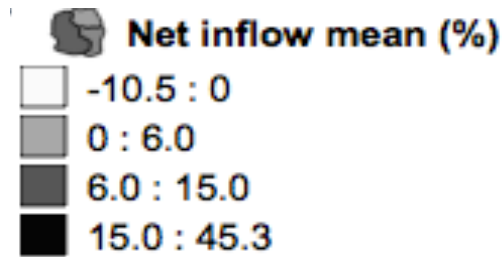
where:

w_{ij} = denotes an element of the spatial weight matrix W , $i \neq j$.

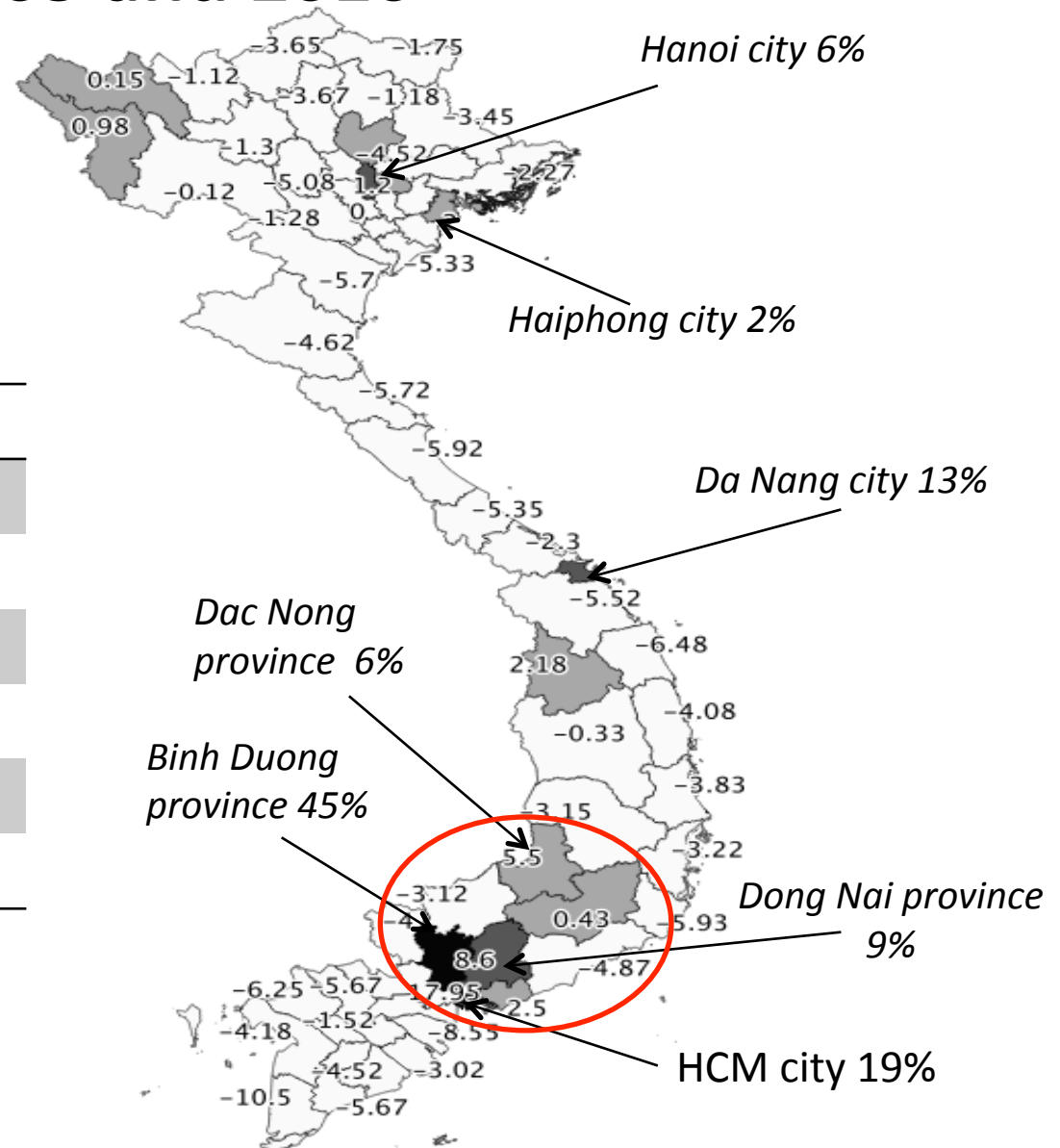
The first-order contiguity spatial weights matrix raw-standardized is employed.

**EMPIRICAL ANALYSIS I:
GEOGRAPHIC AGGLOMERATION OF EMPLOYMENT AND MIGRATION
IN VIETNAM**

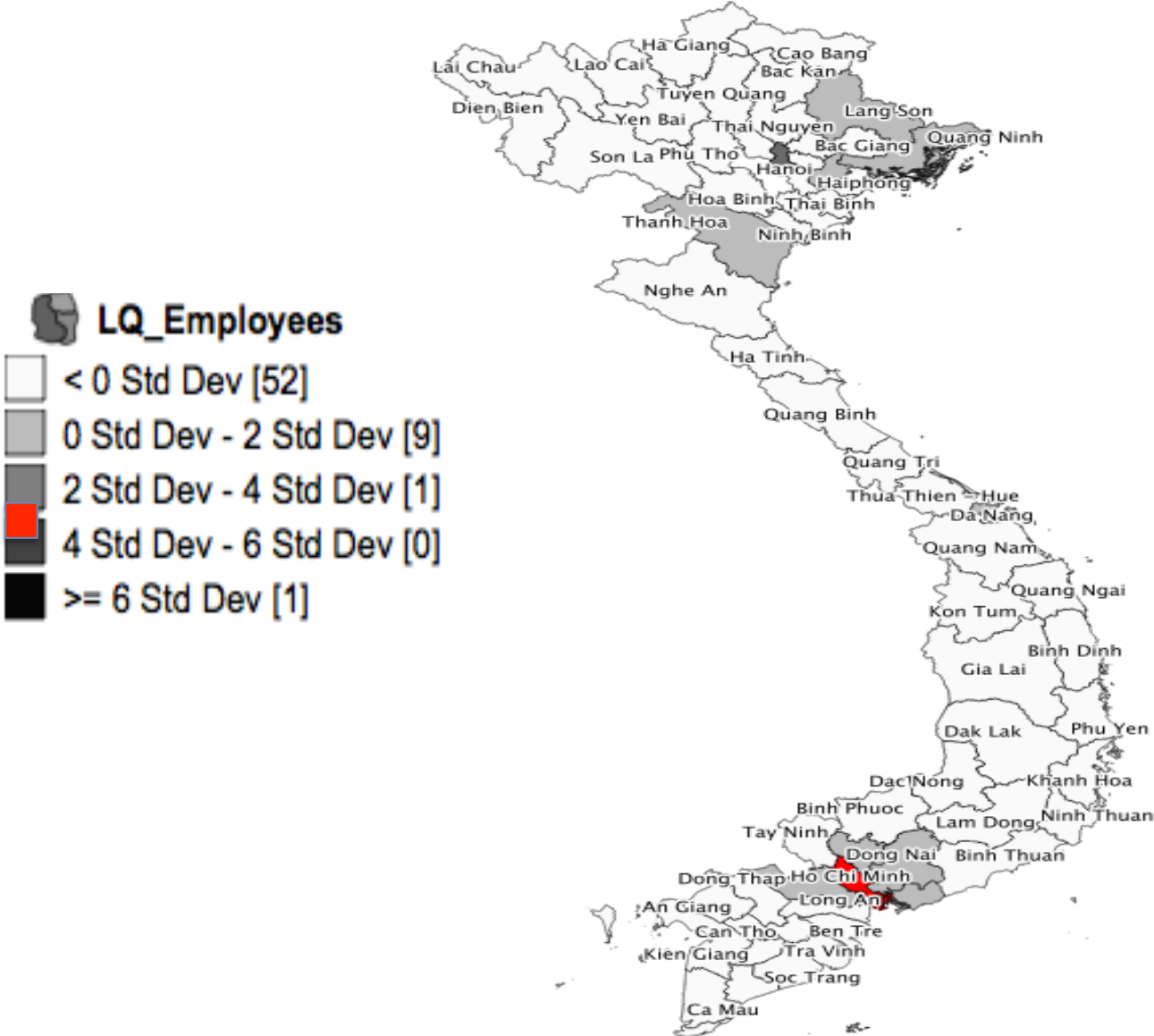
The Average of Net Migration in Vietnam between 2005 and 2010



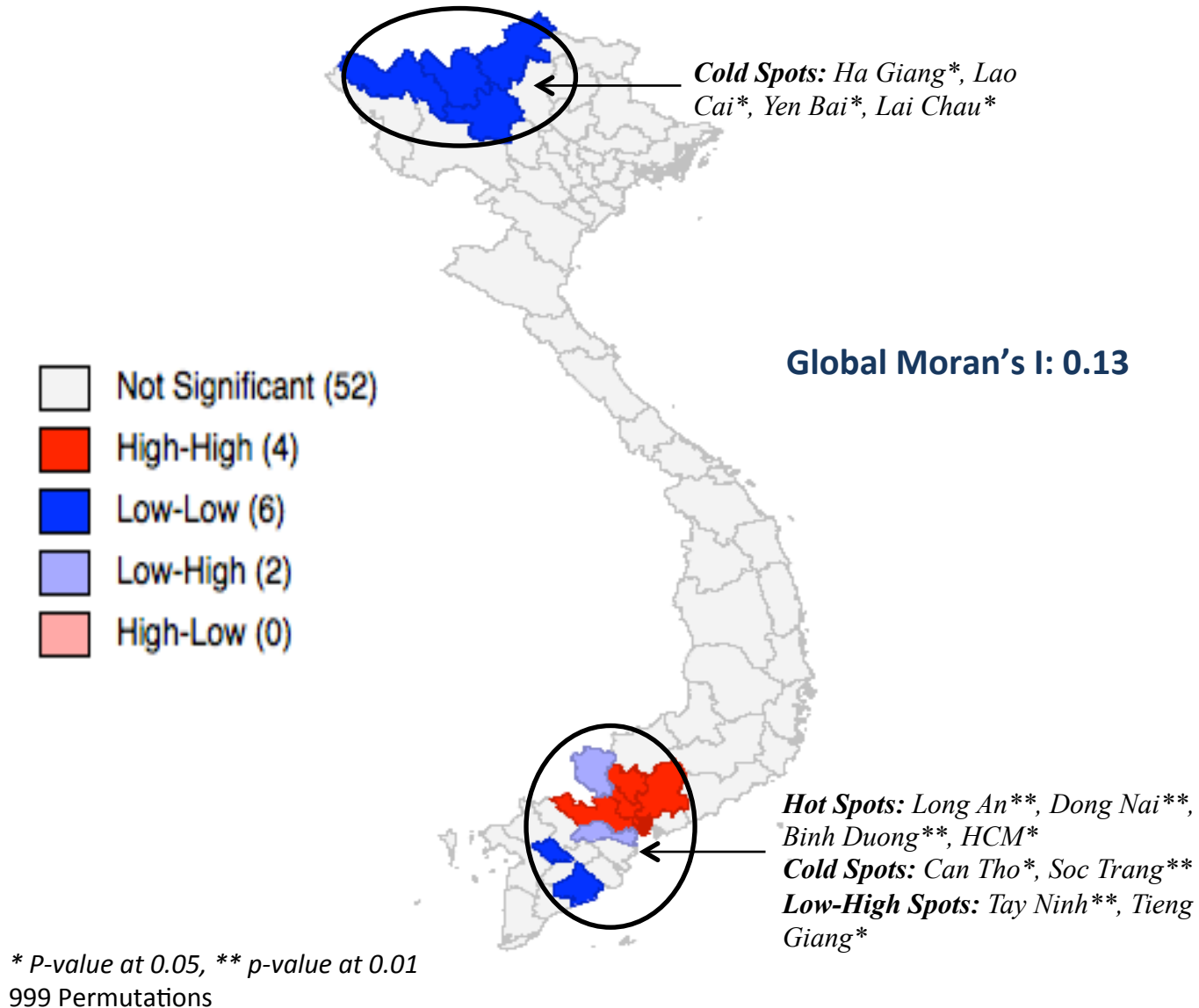
| Region | % |
|---|------|
| South East | 14.3 |
| Red River Delta | -0.1 |
| Central Highlands | -0.5 |
| Northern midlands and mountain areas | -2.1 |
| North Central and Central coastal areas | -4.1 |
| Mekong River Delta | -5.5 |



Average of Manufacturing Specialization within Vietnamese locations in 2010



LISA cluster map of employment in Vietnam in 2010.



Concentration of Employment in Vietnam

| VSIC 2007 | Industry | Gini Empl. | Technology intensity* |
|--------------|---|---------------|--------------------------|
| 14 | Manufacture of wearing apparel | 0.470 | Low |
| 15 | Manufacture of leather and related products | 0.377 | Low |
| 10 | Manufacture of food products | 0.251 | Low |
| 23 | Manufacture of other non-metallic mineral products | 0.144 | Medium low |
| 31 | Manufacture of furniture | 0.137 | Low |
| 19 | Manufacture of coke and refined petroleum products | 0.127 | Medium low |
| 12 | Manufacture of tobacco products | 0.121 | Low |
| 25 | Manufacture of fabricated metal products (except machinery and equipment) | 0.119 | Medium low |
| 33 | Repair and installation of machinery and equipment | 0.114 | Medium low |
| 21 | Manufacture of pharmaceuticals, medicinal chemical and botanical products | 0.109 | High |
| 22 | Manufacture of rubber and plastics products | 0.107 | Medium low |
| 11 | Manufacture of beverages | 0.104 | Low |
| 13 | Manufacture of textiles | 0.104 | Low |
| 28 | Manufacture of machinery and equipment n.e.c | 0.101 | Medium high |
| 18 | Printing and reproduction of recorded media | 0.099 | Low |
| 26 | Manufacture of computer, electronic and optical products | 0.099 | High |
| 29 | Manufacture of motor vehicles; trailers and semi-trailers | 0.096 | Medium high |
| 24 | Manufacture of basic metals | 0.095 | Medium low |
| 27 | Manufacture of electrical equipment | 0.093 | Medium high |
| 20 | Manufacture of chemicals and chemical products | 0.093 | Medium high |
| 17 | Manufacture of paper and paper products | 0.092 | Low |
| 16 | Manufacture of wood and of products of wood and cork (except furniture) | 0.092 | Low |
| 30 | Manufacture of other transport equipment | 0.091 | Medium high |
| 32 | Other manufacturing | 0.091 | - |

**OECD classification for manufacturing industries.*

**EMPIRICAL ANALYSIS II:
REGIONAL CONCENTRATION AND SPECIALIZATION OF TWO-DIGIT
MANUFACTURING INDUSTRIES IN HO CHI MINH AND ITS
SURROUNDING IN 2011**

Structure of GDP at Current Prices by Economic Sector and Type of Ownership in HCM

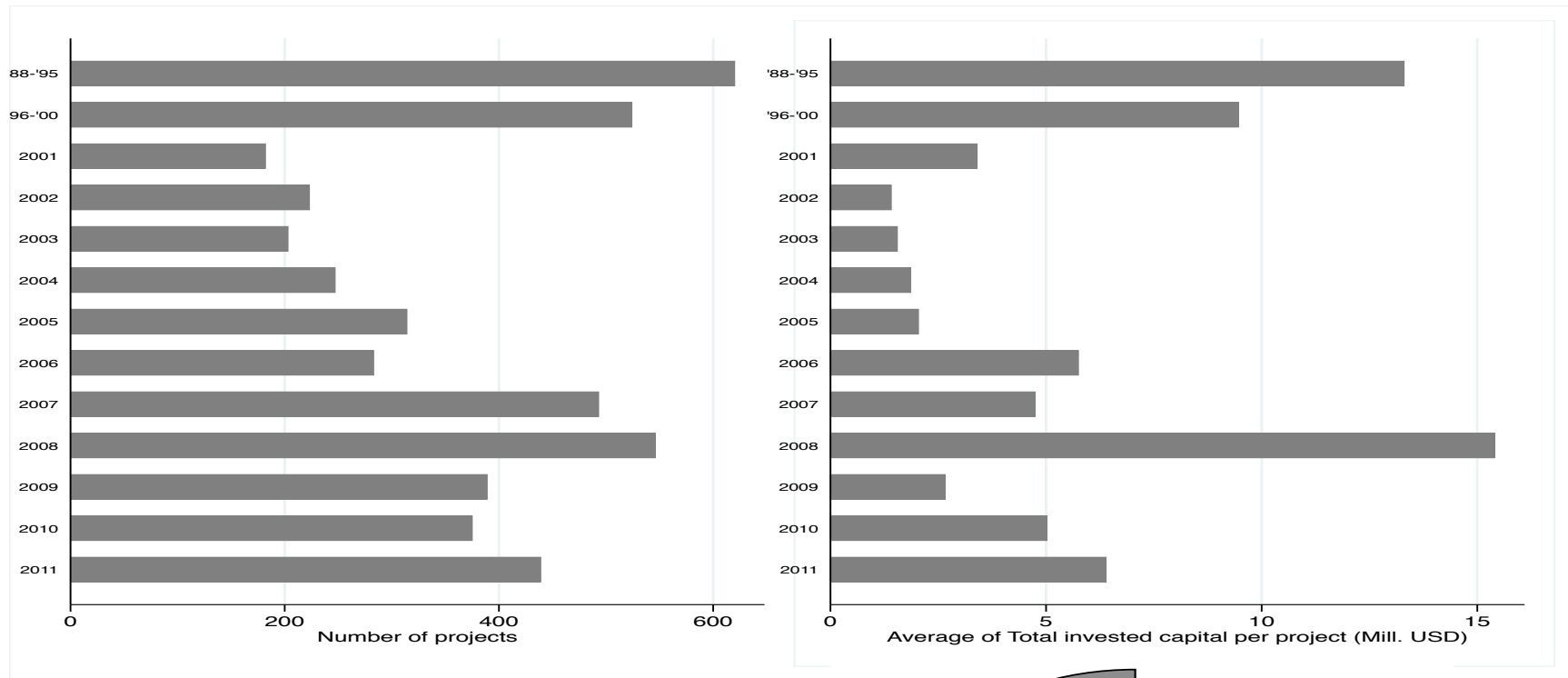
| Period | GDP growth rate | GDP Structure of economic sector per year | | |
|--------|-----------------|---|---------------------------|----------|
| | | Agriculture, forestry and fishery | Industry and construction | Services |
| 2006 | 12.2 | 1,2 | 47,5 | 51,3 |
| 2007 | 12.6 | 1,4 | 46,5 | 52,1 |
| 2008 | 10.7 | 1,4 | 44,1 | 54,4 |
| 2009 | 8.6 | 1,3 | 44,5 | 54,2 |
| 2010 | 11.8 | 1,2 | 45,3 | 53,5 |
| 2011 | 10.3 | 1,2 | 44.5 | 54,3 |

| By type of ownership | 2005 | 2008 | 2009 | 2010 | 2011 |
|----------------------|------|------|------|------|------|
| State | 35,0 | 26,6 | 25,2 | 20,3 | 20,0 |
| Collective | 0,7 | 0,9 | 0,9 | 0,8 | 0,7 |
| Private | 25,6 | 37,4 | 38,9 | 43,8 | 44,0 |
| Household | 16,9 | 12,8 | 11,8 | 10,8 | 10,7 |
| FDI | 21,8 | 22,3 | 23,2 | 24,3 | 24,6 |

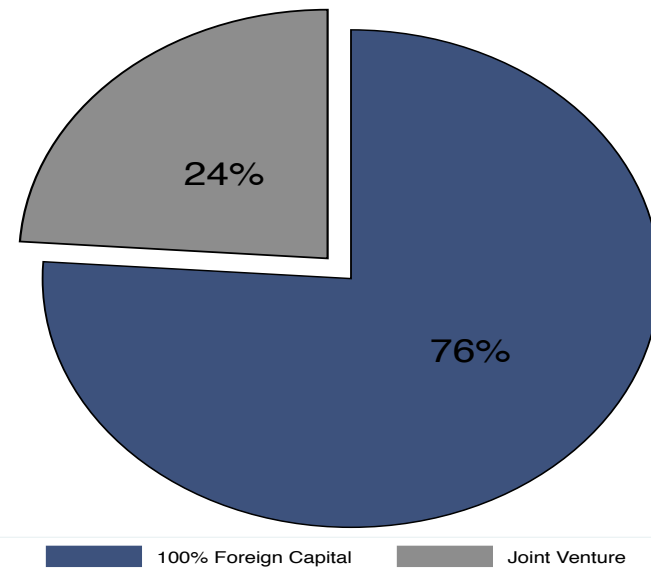
Structure of GDP at Current Prices by Kind of Economic Activity in HCM

| By economic activity | 2005 | 2008 | 2009 | 2010 | 2011 |
|---|------|------|------|------|------|
| Agriculture | 0,9 | 1,2 | 1,1 | 1,0 | 1,0 |
| Forestry | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 |
| Fishery | 0,3 | 0,2 | 0,2 | 0,2 | 0,2 |
| Mining | 0,1 | 0,0 | 0,0 | 0,1 | 0,1 |
| Manufacturing | 41,3 | 37,3 | 36,9 | 37,6 | 37,0 |
| Electricity, gas and water | 1,6 | 1,1 | 1,0 | 1,0 | 0,8 |
| Construction | 5,1 | 5,6 | 6,6 | 6,6 | 6,6 |
| Wholesale and retail trade; repair of moto vehicles, among others | 12,6 | 13,3 | 13,2 | 13,5 | 13,7 |
| Hotels and restaurants | 5,0 | 4,1 | 4,1 | 3,9 | 4,1 |
| Transport, storage and communications | 10,1 | 9,9 | 9,3 | 8,9 | 9,2 |
| Financial intermediation | 5,2 | 11,1 | 11,9 | 12,7 | 13,0 |
| Scientific activities and technology | 0,3 | 0,2 | 0,2 | 0,2 | 0,2 |
| Real estate, renting and business activities | 6,6 | 6,1 | 5,9 | 4,8 | 4,7 |
| Public administration and defence compulsory social security | 1,2 | 1,4 | 1,6 | 1,3 | 1,3 |
| Education and training | 3,1 | 2,3 | 2,2 | 2,2 | 2,2 |
| Health and social work | 3,3 | 3,2 | 3,2 | 3,6 | 3,4 |
| Recreational cultural and sporting activities | 1,7 | 1,2 | 1,1 | 1,0 | 1,0 |
| Activities of membership organizations | 0,1 | 0,1 | 0,1 | 0,1 | 0,1 |
| Community, social and personal service activities | 1,0 | 1,3 | 1,2 | 1,1 | 1,1 |
| Private households with employed persons | 0,2 | 0,2 | 0,2 | 0,2 | 0,2 |

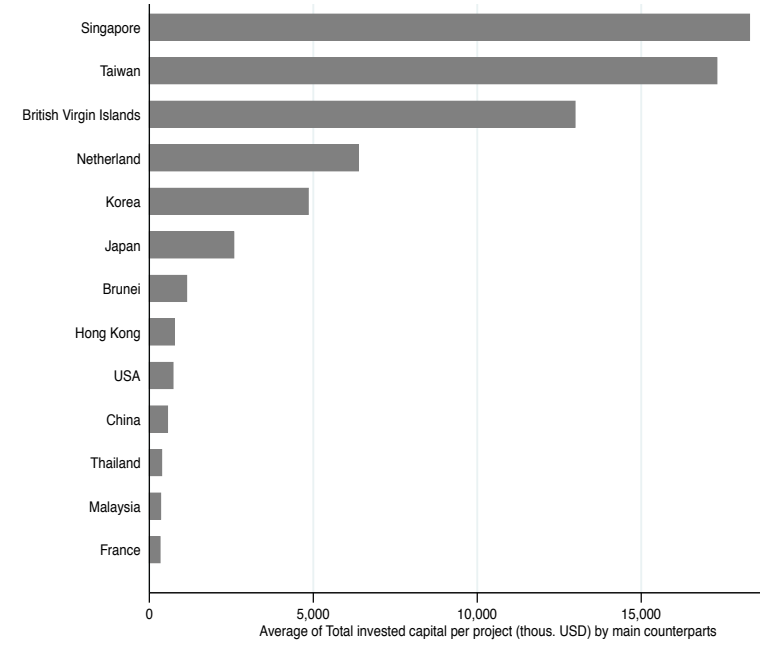
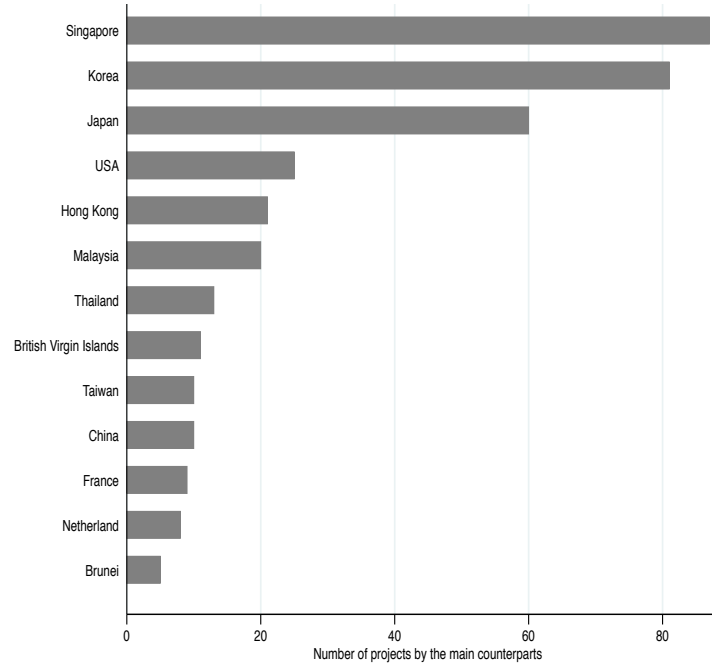
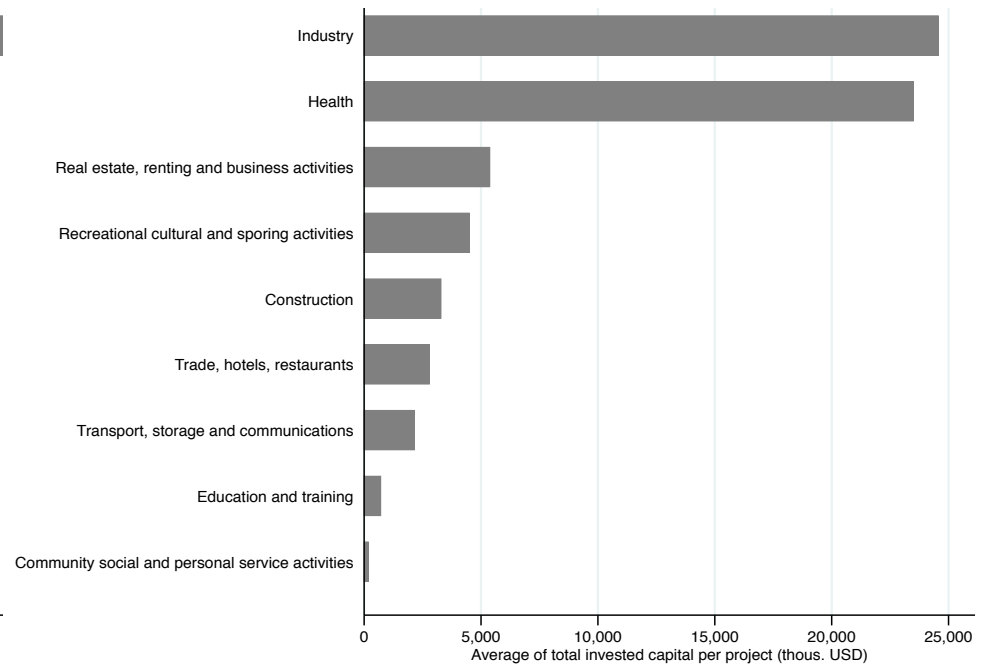
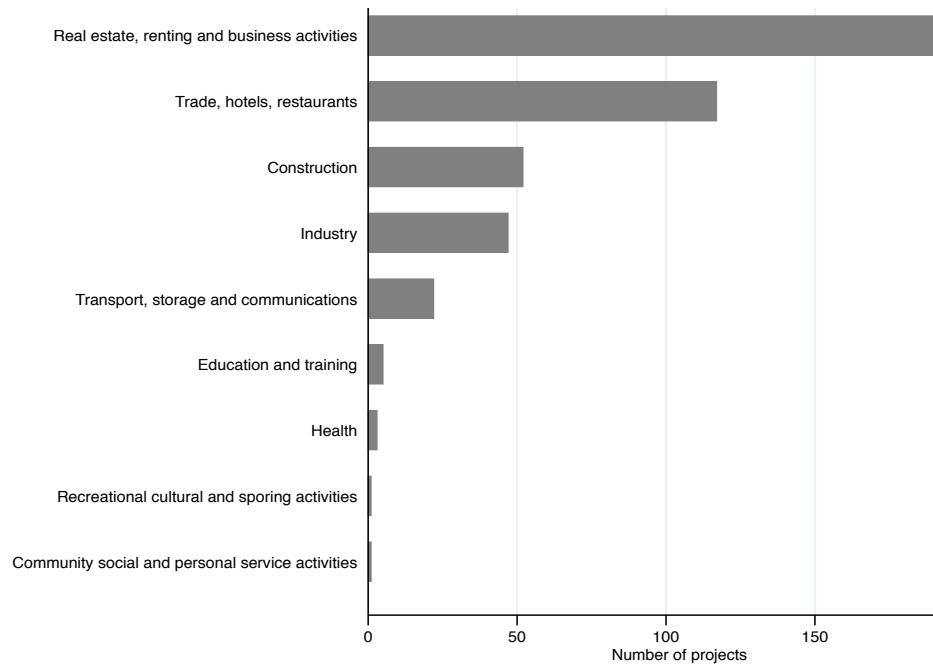
FDI Projects Licensed by Year Licensed in HCM



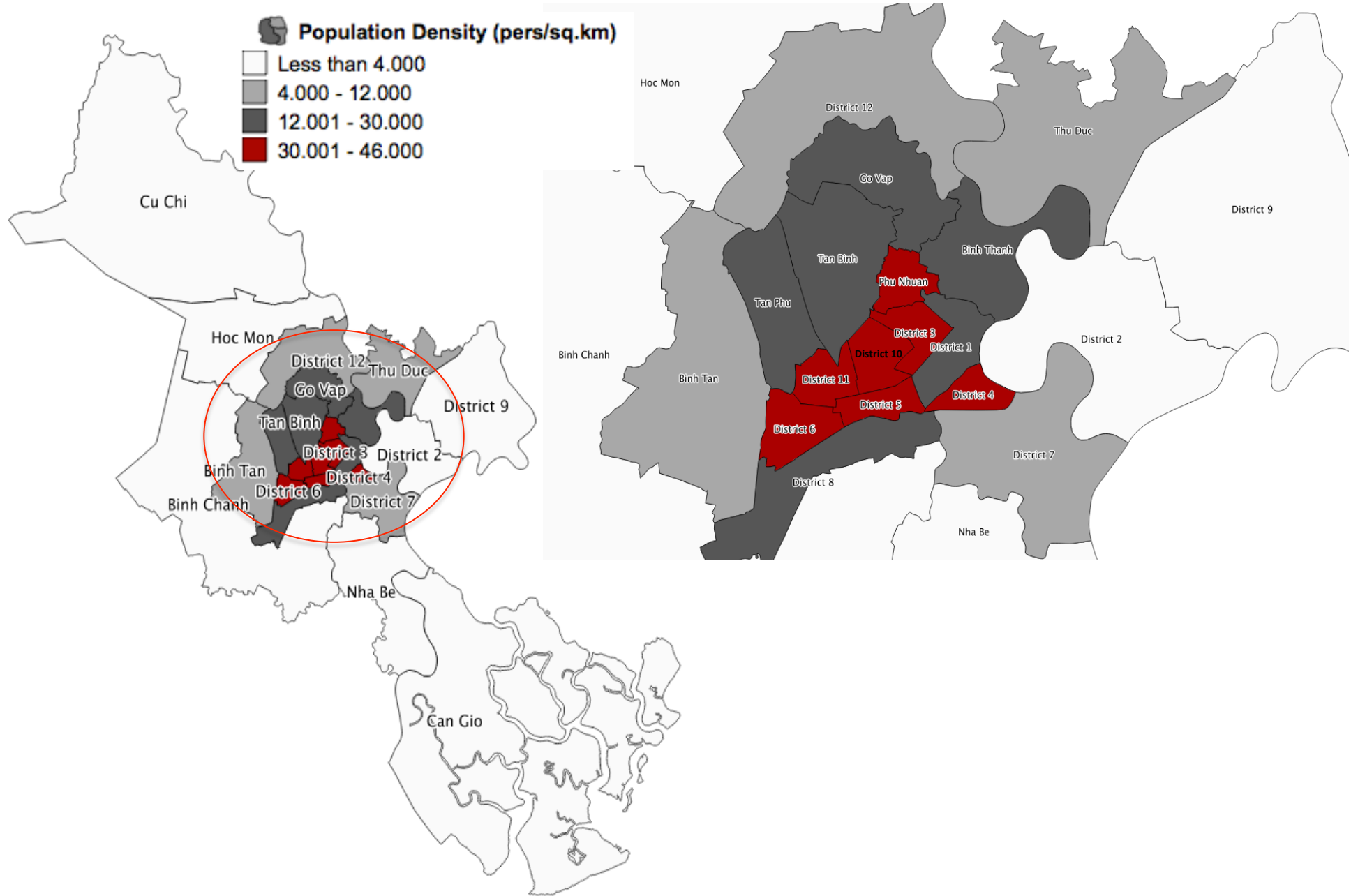
FDI Projects Licensed in 2011 by Type of Investment



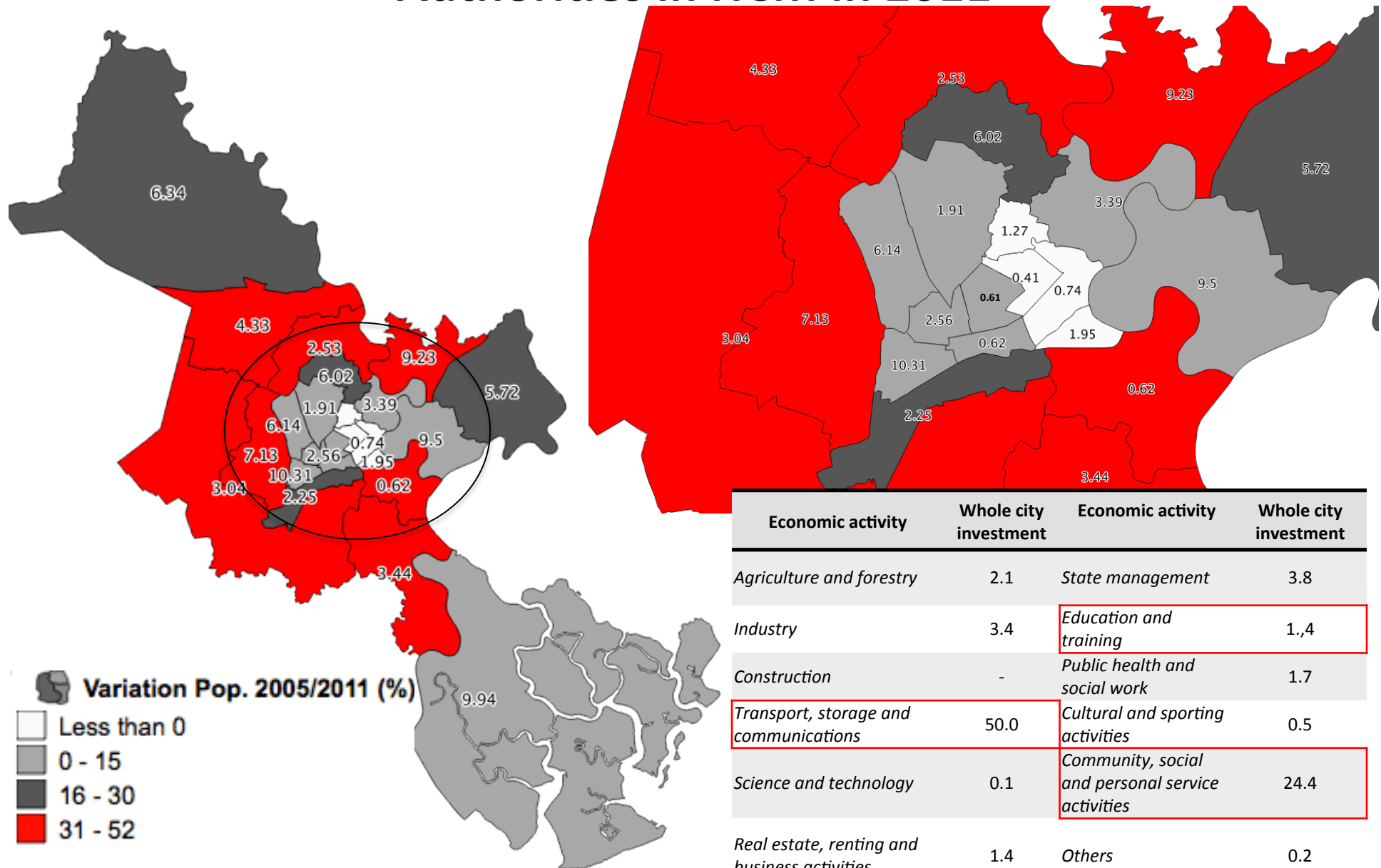
FDI Projects Licensed in 2011 and the Main Counterparts in HCM



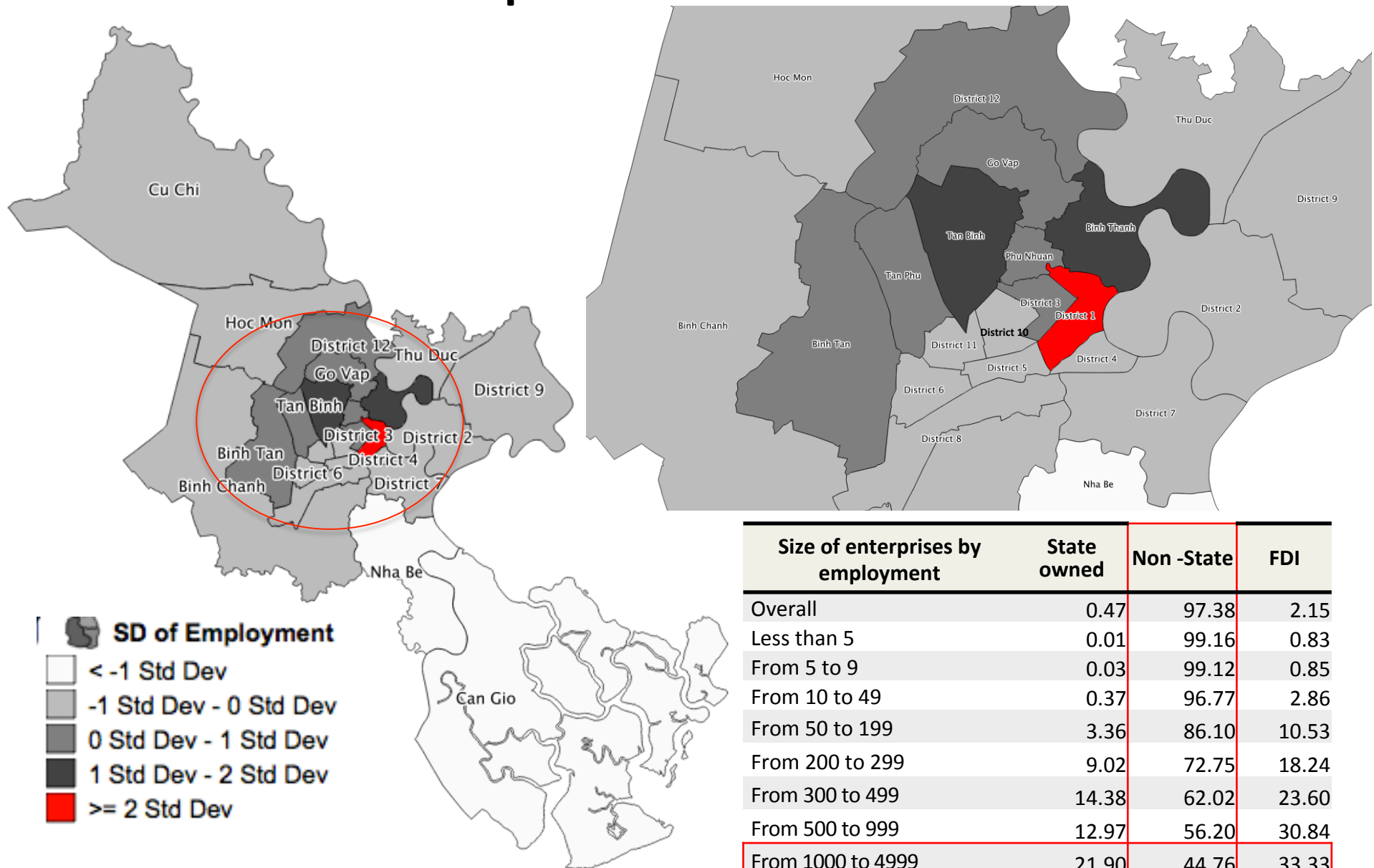
HCM – Population Density 2011



Variation of Population 2005/2011 and Investment by Local Authorities in HCM in 2011



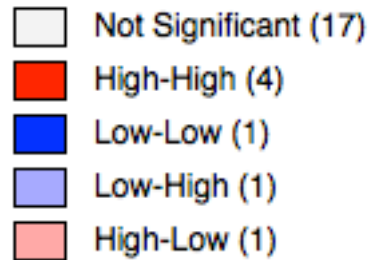
Employment Concentration by District of Non-state Enterprises in HCM in 2011



| Size of enterprises by employment | State owned | Non -State | FDI |
|-----------------------------------|-------------|------------|-------|
| Overall | 0.47 | 97.38 | 2.15 |
| Less than 5 | 0.01 | 99.16 | 0.83 |
| From 5 to 9 | 0.03 | 99.12 | 0.85 |
| From 10 to 49 | 0.37 | 96.77 | 2.86 |
| From 50 to 199 | 3.36 | 86.10 | 10.53 |
| From 200 to 299 | 9.02 | 72.75 | 18.24 |
| From 300 to 499 | 14.38 | 62.02 | 23.60 |
| From 500 to 999 | 12.97 | 56.20 | 30.84 |
| From 1000 to 4999 | 21.90 | 44.76 | 33.33 |
| From 5000 and over | 22.22 | 38.89 | 38.89 |

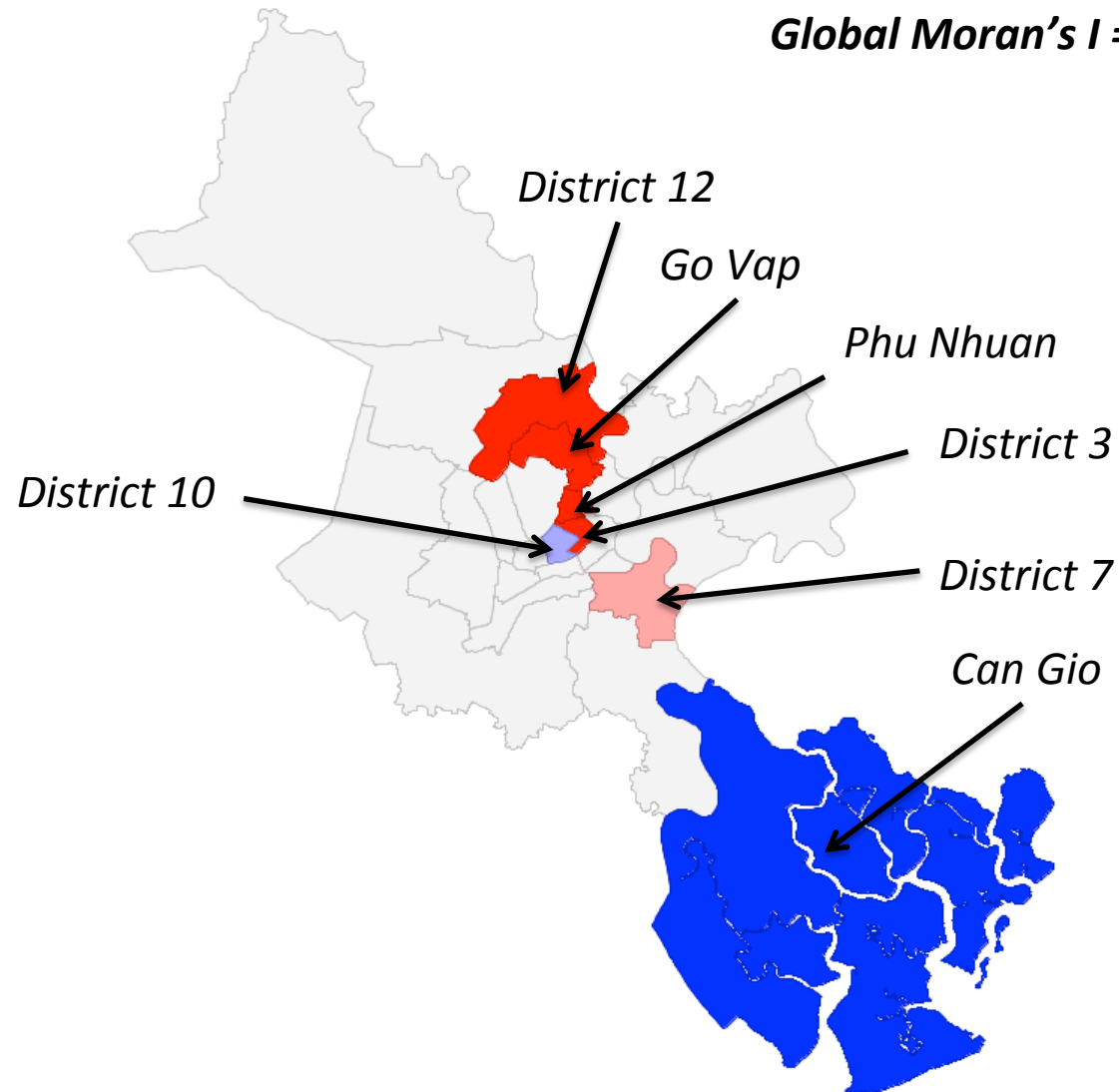
Univariate Local Autocorrelation of Employment of Non-state Enterprises in HCM in 2011

LISA Cluster Map: VNM_



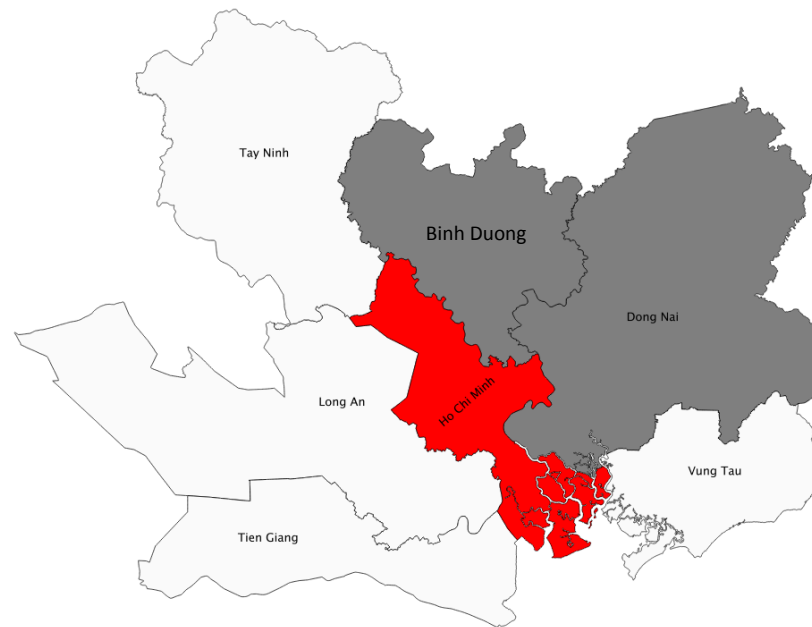
P-value at 0.05
999 Permutations

Global Moran's I = 0.30

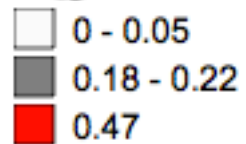


Regional Ratio of Employment within Manufacturing Industries in HCM and its Surrounding in 2011

Regional Ratio of Employment in Manufacturing industries



Employment Ratio in the Region



Regional Concentration and Specialization of Selected Industries in HCM and its Surrounding in 2011

| VSIC 2007 | Industry | Specialization (LQ > 1) | Gini |
|-----------|---|--|------|
| 14 | Manufacture of wearing apparel | Tay Ninh (17), Long An (4), Binh Duong (1) | 0.37 |
| 16 | Manufacture of wood and of products of wood and cork (except furniture) | Tay Ninh (2) | 0.37 |
| 10-11 | Manufacture of beverages-Manufacture of food products | Tay Ninh (10), Long An (6) | 0.36 |
| 22 | Manufacture of rubber and plastics products | Tay Ninh (3), Long An (1) | 0.32 |
| 23 | Manufacture of other non-metallic mineral products | Tay Ninh (2) | 0.31 |
| 15 | Manufacture of leather and related products | Tay Ninh (12), Long An (9), Dong Nai (2), Binh Duong (1) | 0.3 |
| 25 | Manufacture of fabricated metal products (except machinery and equipment) | Tay Ninh (3), Long An (1) | 0.3 |
| 13 | Manufacture of textiles | Tay Ninh (2), Long An (1) | 0.27 |
| 31 | Manufacture of furniture | Binh Duong (2), Dong Nai (1), Tay Ninh (1) | 0.15 |

CONCLUSIONS

Conclusions

- Vietnam was characterized by high provincial inequalities where Hanoi and Ho Chi Minh played a predominant role in the Vietnamese economy, as they attracted large part of the country's business activities. The migratory flows strengthened this socio-economic imbalance among provinces.
- High economic polarization emerged in the South of the country in particular within Ho Chi Minh City and nearby provinces favouring an integrated region.
- In HCM, service industries grew faster than other industries between 2005 and 2011 with particular reference to financial intermediation.

Conclusions (Cont.)

- The weight of state-owned firms considerably decreased between 2005 and 2011 within the city's economy, whereas private businesses and FDI constantly increased. Singapore, Taiwan and British Virgin Island are the largest partners In terms of capital invested per FDI's project.
- The population density by districts was concentrated in a concentric form in HCM in 2011, where the center was the most dense and the number of inhabitants decreased when the distance increased from the core. However, the variation of population significantly increased within the periphery (rural districts) between 2005 and 2011.
- The highest concentration of economic activities was in the District 1 in 2011. The state-owned firms and FDI in HCM was characterized by large number of employment.

Conclusions (Cont.)

- Significant Hot-spots (HH) are identifiable in nearby districts in HCM such as District 12, Go Vap, Phu Nhuan and District 3.
- Ho Chi Minh, Binh Duong, Dong Nai, Long An, Tay Ninh, Vung Tau and Tien Giang held more than 40% of country's employment in 2011.
- Tay Ninh and Long An are the most specialized locations in particular with reference to beverages and food products, wearing apparel, leather and related products. Whereas, HCM was characterized by an overall high employment concentration though no industries showed a predominant localization within the city in terms of number of employment.
- The manufacturing of wearing apparel, and manufacturing of wood and products of wood and cork (except furniture) had the highest concentration in the South region in 2011. Whereas the manufacture of furniture had the lowest concentration coefficient.



THANK YOU

Q&A

Roberto Ercole
University of Huddersfield
roberto.ercole@hud.ac.uk

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