Potential & Active Network's combinations and their effects on job search and matching

Evidence from Colombian Labour Market

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Social network and labor market

- **Networks are a relevant approach to understand social and institutional processes which organize labor markets**
  - Importance of relational embeddedness to explain individual behavior and generate labor market outcomes (Granovetter 1973,[1974] 1995, 2017; Marsden and Gorman, 2001; Ioannides and Datcher Loury, 2004; Topa, 2011; Beaman 2016; Smith, 2016; Schumtte, 2016)
  - *A fortiori* in Developing Countries where formal institutions are failing, ineffective or non-existent (Fafchamps, 2006; Meagher, 2006; Berrou and Combarnous, 2012; Nordman and Pasquier-Doumer, 2015). But...
- ...**no consensus on the effect of relations on job performances** (Magruder, 2010; Yogo, 2011; Chua, 2011; Diaz, 2012)
  - Job search process and job matching (income, satisfaction...)

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- **Potential network (Bourdieu, 1980, 1986; Lin, 1999, 2008)**
  - Set of accessible resources, through legacy of the internalization of past experiences and a construction social-relational day-to-day with alters in the social hierarchy (Bourdieu, 1980, 1986; Lin, 1999, 2008)
  - Shape : accesss to high social prestige position, diversity
  - Potential resources are likely to be concretely activated or not

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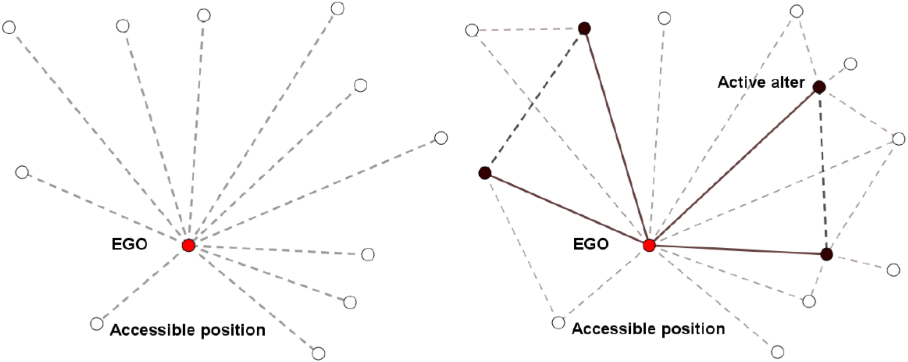
  - Shape : accesss to high social prestige position, diversity
  - Potential resources are likely to be concretely activated or not
- **Active network (Granovetter, 1973; Burt, 1992)**
  - Specific mobilized/activated relations for a specific purpose and at a particular moment (ex: to find a job)
  - Shape : content of ties, homophily, structure

What are we talking about? Two type of networks



Different mechanisms and effects of potential and active networks on the labor market

- **Potential network (PN)**

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- **Potential network (PN)**
  - The more extended (**access** and **accumulation** of high social prestige; **diversity** of positions)...:
    - ...*More information* $\longrightarrow$ *more opportunities*. Makes it possible to obtain a better job, in US (Lin and Ao, 2008), Germany (Volker and Flap, 1999) or China (Lin et al., 2013)
    - ...*Better signal to employers* $\longrightarrow$ *better matching* (positive impact on earnings and job satisfaction ; Lu et al., 2013; Bian et al., 2015)

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  - The more open the AN (**weak ties**, **structural holes** and **heterophily**)...:
    - ...*The more novel, relevant and/or non-redundant information* $\longrightarrow$ *quality of the information*. Positive impact on job search and income (Yakubovitch, 2005; Fernandez, 2016)
    - ...*The more control of the information* $\longrightarrow$ *brokerage mechanism*. Strategic advantage increasing the credibility and access to new opportunities (Lutter, 2015; Marti et al., 2017)

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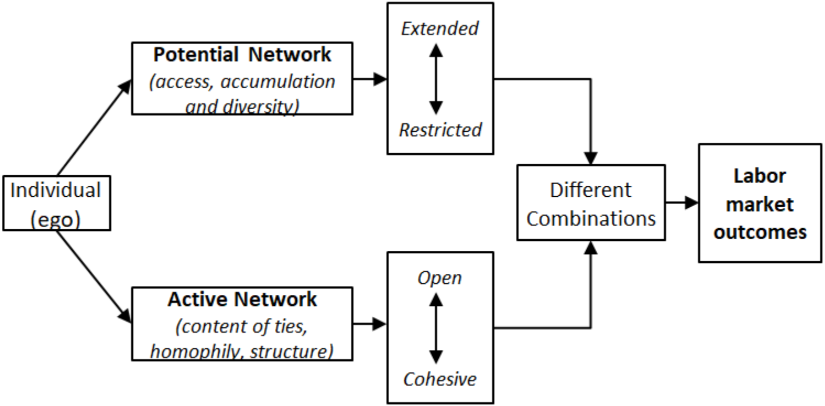
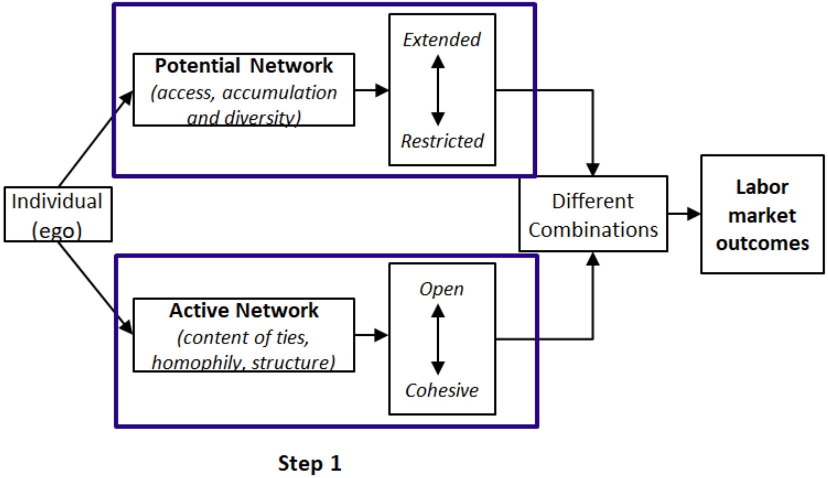
    - ★ ...*The more control of the information* $\longrightarrow$ *brokerage mechanism*. Strategic advantage increasing the credibility and access to new opportunities (Lutter, 2015; Marti et al., 2017)
  - **But, cohesive networks are also useful**:
    - ★ *Better information transfer* $\longrightarrow$ *quality of the information (motivation of the referrals)*. Only one strong tie tends to increase significantly the probability of getting a job (Gee et al., 2017)
    - ★ *Better information sharing and respect of social norms* $\longrightarrow$ *reduce asymmetrical information problems* (Karlan et al., 2009)

Analytical framework



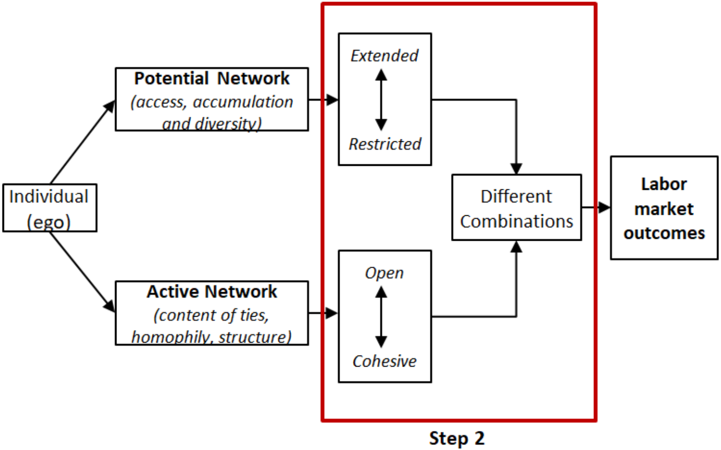
Analytical framework



STEP 1

What potential and active networks configurations ?

Analytical framework

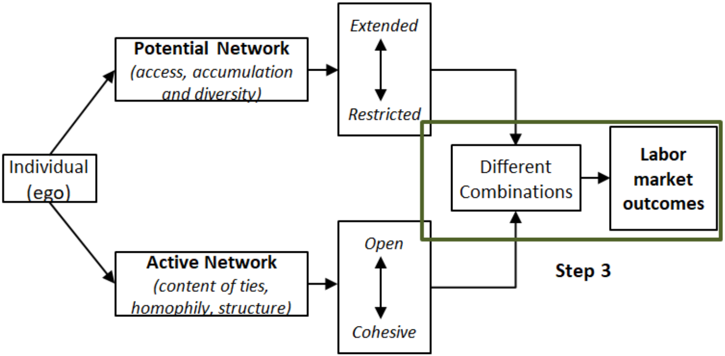


STEP 2

Are potential and active networks are independent?

What are the possible configurations?

Analytical framework



STEP 3

Impact of the different combinations of PN and AN on job search and matching processes

Bogota's Context

In 2016, Bogota had nearly 8.3 million inhabitants (17.5% of the Colombian population)

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1. **Bogota's socioeconomic context**
   - High inequality (Gini index for income: 0.52 in 2016)
   - Stratum give a good approximation of the social hierarchy, each edifice is classified between 1 (poorest) and 6 (richest)
   - Bogota has a relatively low poverty rate (17% in 2011), it remains high in strata 1 (40%) and 2 (25%)
2. **Bogota's labor market**
   - More than 4 million people, with an occupation rate of 67% and 8.3% of unemployment (DANE 2016)
   - 32% of active workers appear in subjective underemployment, 20.3% in skill-related inadequate employment and 27.2% in income-related inadequate employment
3. **Institutional context**
   - *Servicio Publico del Empleo* (SPE) was established in the last trimester of 2013 in Colombia (Law 1636 of 2013), but more than 67% of workers found their current job through their social relations in 2016 (*vs.* 65% in 2013)

Original data

- **GEIH-REDES (2016-2017)** $\longrightarrow$ Matched network data (REDES) with household data (GEIH)
- **Sampling method** $\longrightarrow$ Representative subsample: 1600 workers in Bogota (coming from household survey –GEIH 2016–) ▸ Sample
- **Network data recollection**:
  - **Potential network**
    - ★ **Position Generator** (Lin, 2001, 2008; Van der Gaag et al., 2008) $\rightarrow$ *Accessed resources and social prestige in potential network* $\longrightarrow$ *using ESEI scaling (Ganzeboom et al., 1992; 2003))* ▸ Position Generator
  - **Active network**
    - ★ **Name Generator** $\rightarrow$ *Name of each alter in the personal network of ego* ▸ Name Generator
    - ★ **Name Interpreters** $\rightarrow$ *Ties and alter characteristics* ▸ Alter Characteristics
    - ★ **Relational Matrix** $\rightarrow$ *Network structure* ▸ Network Structure

Network characteristics

Potential network (Van der Gaag et al., 2008)

- **Reachability** $\longrightarrow$ range between the prestige of the highest position and ego's one ($|P_j^{max} - P_{ego}|$), dissymetry ($\frac{\sum higher.pos.}{\sum lower.pos.}$)
- **Extensity** $\longrightarrow$ diversity ($\sum |P_j - P_{ego}|$), size (number of positions and number of potential contacts specifically to find a job [PG])
- **Accumulation** $\longrightarrow$ Total prestige ($\sum P_j$), average prestige ($\frac{\sum P_j}{\sum pos.}$)

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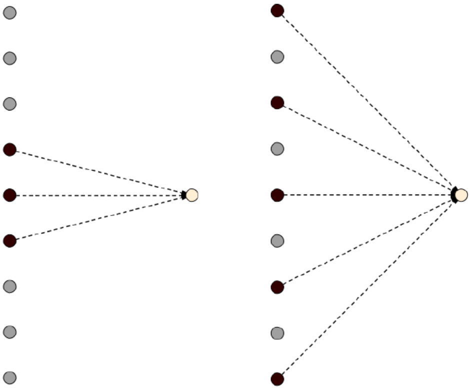
Active network (Marti et al., 2017)

- **Structural measures** $\longrightarrow$ density, size (number of alters cited [NG])
- **Content of ties** $\longrightarrow$ high trust (%), high reciprocal trust (%), high frequency (%), social roles (%), geographical proximity (%), duration mean (month)
- **Alter attributes (homophily/heterophily)** $\longrightarrow$ same gender (%), same education level (%), same income (%), age mean in the network

Step 1: Potential and active network configurations

Method: Hierarchical Clustering (HC)

* ⋆ Potential network variables ‣ Dendrogram PN
* ⋆ Active network variables ‣ Dendrogram AN



(a) Restricted potential network (b) Extended potential network

Result 1: Two groups in both potential and active networks ‣ Summary statistics

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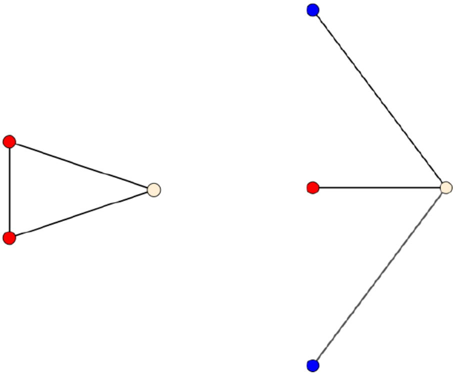


(c) Cohesive active network (d) Opened active network

Result 1: Two groups in both potential and active networks ▸ Summary statistics

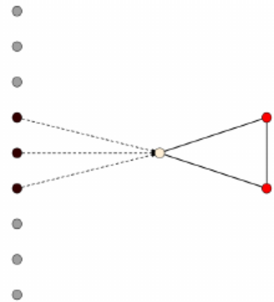
Step 2: Association between network configurations

Method: χ^2 test and controlled correlation (Logistical estimations : Probit) Estimation result

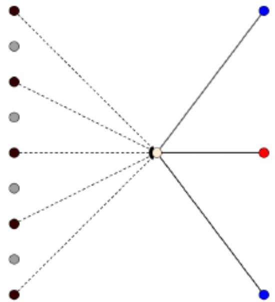
		Potential network	
		Restricted	***Extended***
Active network	***Cohesive***	305 (*311.3*)	123 (*116.7*)
	Opened	522 (*515.7*)	187 (*193.3*)

Pearson Chi^2 : **0.75**
Cramer's V : **-0.03**

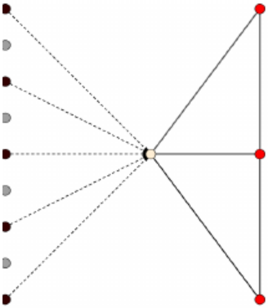
Result 2: No association between potential and active configurations (Lai et al., 1998; Mouw, 2003; Obukhova et Lan, 2013; Small and Sukhu, 2016)



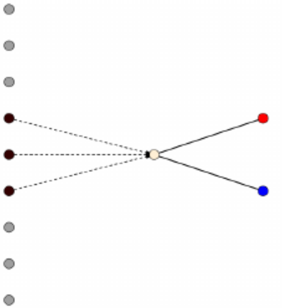
(a) Restricted and cohesive



(b) Extended and opened

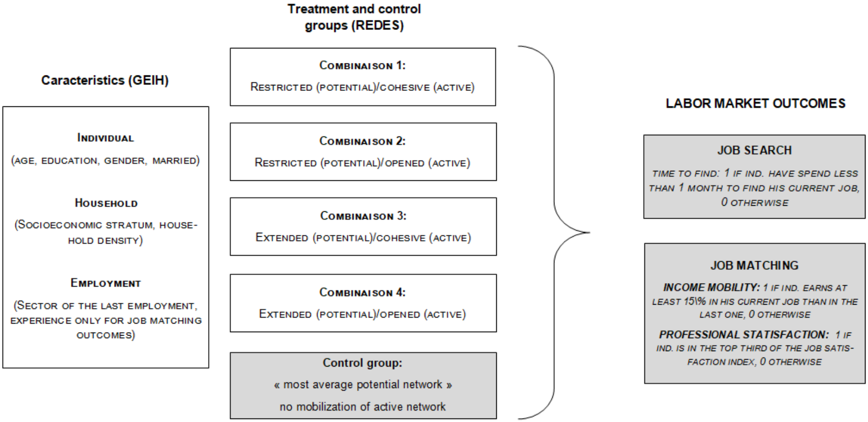


(c) Extended and cohesive



(d) Restricted and opened

Step 3: Effects of network combinations on job search and job matching (method)



Method: **Quasi-experimental strategy: IPWRA estimator** (Imbens and Wooldridge, 2009; Wooldridge, 2009,2010; Cattaneo, 2010) ⟶ **Adapted for multiple treatment, Double robust model** ▸ Summary statistics

Step 3: Effects on job search and job matching (findings)

	Job search	*Job matching*	
	Time to find	Professional satisfaction	Income mobility
Combinations			
Resticted (potential)/Cohesive (active)	– –		
Resticted (potential)/Opened (active)			
Extended (potential)/Cohesive (active)	– –	+ +	
Extended (potential)/Opened (active)			–

Result 3: ▸ Estimation results

- ⋆ **Combination between restricted (potential) and cohesive (active) networks increase the time to find a job** ⟶ Less opportunities, less capacities to signal, more redundant *within-group* informations (Granovetter, 1995; Lin 1999; Erikson, 2003; Yakubovtich, 2005)
- ⋆ **Combination between extended (potential) and cohesive (active) networks increase the time to find a job...but produce a better matching in terms of satisfaction** ⟶ More opportunities, more capacities to signal and social support during transition periodes (Colleman, 1988, 1990; Obukhova, 2012)
- ⋆ **Individuals using a combination between extended (potential) and opened (active) networks are less likely to increase their income between last and current job** ⟶ Explaining by the top 25% of income distribution

Discussion: Labor market institutions

- **Results appear consistent with the institutionalist approach of networks in emerging economies**
  - Positive effect of cohesive networks in Russia (Clarke, 2000; Gerber, 2010)
  - Positive effect of extended and cohesive networks in China (Lu et al., 2013, Obukhova and Zhang, 2017)

Discussion: Labor market institutions

- **Results appear consistent with the institutionalist approach of networks in emerging economies**
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- **Institutional issue in Colombia (Deguilhem et al., 2018)**
  - Weaknesses of the *Servicio Nacional del Empleo*?

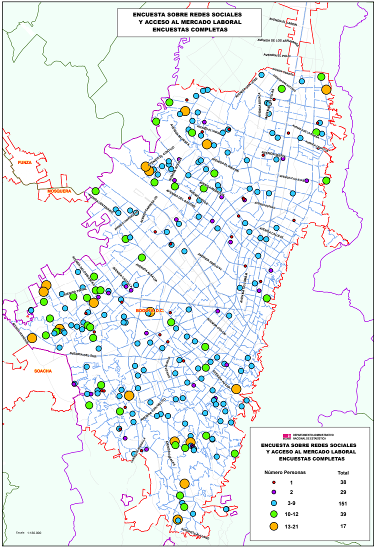
    ⟶ Major part of unemployed people do not have unemployment insurance (for waiting good opportunities)

    ⟶ Targeting problem of the SNE services (major part of unemployed people registred by SNE system are not vulnerable)
  - Persistence of old social practices: patronage system (*Palancas* and *Padrinazgo*)?

    ⟶ Low middle class and vulnerable people highlight that “padrino” is very important in different steps of personal life (education, employment, political participation...)

Thank you for your attention

Appendix



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1 ¿Cuáles son los nombres (sin apellido) de las personas que le ayudaron o intentaron ayudar a buscar su empleo o trabajo actual durante los doce meses anteriores a conseguirlo?

Nro. de Orden — # de personas: P1741

Nro. de Orden	Nombre	
1	______ Nombre	P1741S1
2	______ Nombre	P1741S2
3	______ Nombre	P1741S3
4	______ Nombre	P1741S4
5	______ Nombre	P1741S5
6	______ Nombre	P1741S6
7	______ Nombre	P1741S7
8	______ Nombre	P1741S8
9	______ Nombre	P1741S9
10	______ Nombre	P1741S10

Piense en las personas que intentaron ayudarle. Por ejemplo, dándole información sobre empleos potenciales, presentándole a otras personas, etc. No es necesario que el trabajo que consiguió haya sido a través de esta persona. Incluya también personas que le intentaron ayudar sin que usted estuviera buscando trabajo.

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D. INFORMACIÓN DE LA RED (Para todas las personas registradas en el capítulo C)

¿Cuál es el sexo de ... ? **P6020**	**1**	Hombre [1] Mujer [2]
¿Aproximadamente cuántos años tiene ... ? **P5415**	**2**	Años
¿Cuál es el nivel educativo más alto alcanzado por .... y el último año o grado aprobado en este nivel? **Nivel educativo: P6210** **Último nivel alcanzado: P6210S1**	**3**	a. Ninguno [1 0] b. Preescolar [2 0] c. Básica primaria (1o - 5o) [3 0] d. Básica secundaria (6o - 9o) [4 0] e. Media (10o - 13o) [5 1] f. Superior o universitaria [6] g. No sabe, no informa [9 9]
¿... tiene ingresos mayores, menores o aproximadamente iguales a los suyos? **P1724**	**4**	a. Mayores [1] b. Menores [2] c. Iguales [3]

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Antes de que le
ayudaran en su búsqueda de empleo
¿Algunos de estos contactos se conocían entre sí?

Para cada posible combinación. Por ejemplo:

- La persona 2 con la persona 1
- La persona 3 con la persona 1
- Etc.

Marque si estas dos personas:

- 1 = Se conocían muy bien
- 2 = Se conocían
- 3 = No se conocían
- 4 = No sabe / No responde

14

	1	2	3	4	5	6	7	8	9	10
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										

 # de persona respecto a quien se pregunta: P1733S1
Qúe tanto se conocen: P1733S2

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P1723

Para cada una de las siguientes ocupaciones, indique si conoce personas que la desempeñen.

No incluya personas que conoció desde que tiene su nuevo empleo o trabajo.

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		Familiar	Amigo	Conocido	Nadie	
a.	Abogado	1	2	3	4	P1723S1
b.	Académico / Profesor universitario	1	2	3	4	P1723S2
c.	Albañil / Obrero de construcción	1	2	3	4	P1723S3
d.	Campesino / Jornalero agropecuario	1	2	3	4	P1723S4
e.	Capataz / Pequeño productor agropecuario	1	2	3	4	P1723S5
f.	Concejal, diputado, alcalde	1	2	3	4	P1723S6
g.	Conductor de bus, camión, taxi, etc.	1	2	3	4	P1723S7
h.	Contador	1	2	3	4	P1723S8
i.	Ingeniero	1	2	3	4	P1723S9
j.	Mecánico	1	2	3	4	P1723S10
k.	Médico	1	2	3	4	P1723S11
l.	Mesero	1	2	3	4	P1723S12

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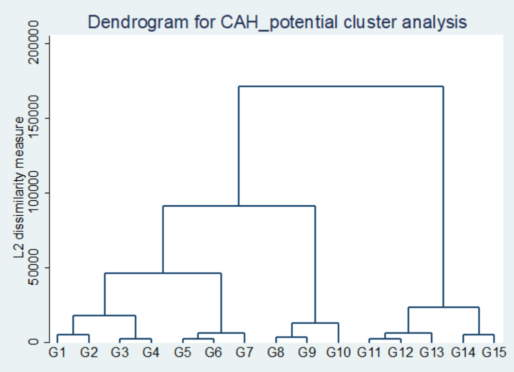
Potential network classification



Numb. clusters	DH *Je(2)/Je(1)*
2	**0.3588**
3	0.3115
4	0.2970
5	0.3059

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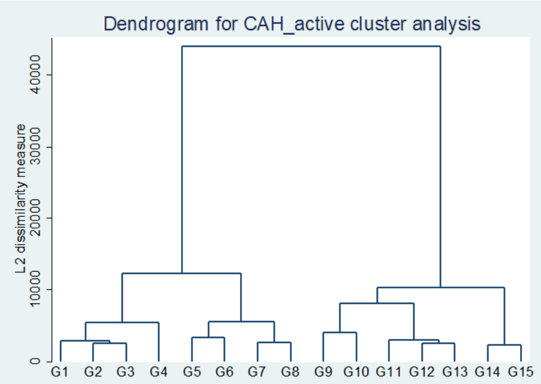
Active network classification



Numb. clusters	DH $Je(2)/Je(1)$
2	**0.8411**
3	0.7703
4	0.8078
5	0.8335

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	Potential		Active		Total
	Restricted	Extended	Cohesive	Opened	
Size (potential)	*5.09*	**8.07**	6.25	**6.46**	5.82
	(7.15)	(11.55)	(8.76)	(8.68)	(8.57)
Mean pres.	*44.46*	**50.88**	46.03	46.79	46.54
	(9.93)	(4.04)	(9.43)	(9.72)	(9.67)
Total pres.	*373.61*	**824.56**	500.03	490.16	485.19
	(170.96)	(113.67)	(267.65)	(253.70)	(257.98)
Reachability	*29.17*	**34.84**	**32.31**	30.74	30.68
	(14.27)	(12.99)	(13.87)	(14.03)	(14.12)
Diversity	*18.95*	**20.61**	19.22	19.38	19.47
	(5.54)	(2.49)	(5.06)	(4.92)	(5.11)
Dissymetry	*0.89*	**1.08**	0.94	0.94	0.94
	(0.98)	(0.78)	(0.80)	(0.92)	(0.94)
Numb. pos.	8.21	**16.30**	10.52	10.25	10.17
	(3.31)	(2.53)	(5.12)	(4.79)	(4.87)
Age (net)	38.47	38.58	**42.13**	*36.42*	38.56
	(11.09)	(10.91)	(11.15)	(10.36)	(11.01)
Density	0.70	0.67	**0.71**	0.67	0.69
	(0.28)	(0.31)	(0.28)	(0.30)	(0.29)
Size (active)	*1.77*	**2.03**	1.86	1.84	1.85
	(1.04)	(1.13)	(1.08)	(1.08)	(1.08)
High freq. (%)	68.15	64.61	**74.10**	*62.77*	67.01
	(41.94)	(40.54)	(38.82)	(42.54)	(41.54)
High trust (%)	44.53	51.81	**60.63**	*37.66*	46.25
	(44.57)	(42.68)	(43.15)	(42.25)	(44.00)
High rec. (%)	43.93	**50.69**	**59.30**	*37.15*	45.43
	(44.41)	(42.15)	(43.51)	(41.80)	(43.76)
Duration (mean)	146.82	146.96	**273.42**	*69.99*	146.08
	(131.80)	(117.98)	(112.76)	(48.83)	(126.24)
Family (%)	38.99	34.99	**67.83**	*19.95*	37.86
	(44.74)	(41.88)	(41.57)	(34.39)	(43.84)
Friends (%)	43.46	**49.38**	*24.39*	**57.48**	45.11
	(44.30)	(43.73)	(37.09)	(43.30)	(44.09)
Geo. prox. (%)	19.54	*13.53*	**27.07**	*17.96*	17.82
	(36.27)	(30.51)	(41.38)	(28.99)	(34.85)
Neighborhood (%)	23.24	21.41	*18.08*	**25.75**	22.75
	(37.74)	(35.15)	(34.37)	(38.18)	(36.96)
City (%)	50.84	**58.25**	*48.51*	55.07	52.61
	(45.09)	(42.37)	(44.83)	(43.88)	(44.33)
Same gen. (%)	**70.97**	*65.09*	70.32	68.63	69.26
	(39.61)	(38.36)	(38.49)	(39.50)	(39.12)
Same inc. (%)	31.59	*24.36*	*26.17*	31.25	29.35
	(41.82)	(36.67)	(38.76)	(41.25)	(40.40)
Same edu. (%)	40.80	53.41	42.06	45.79	44.39
	(45.02)	(44.07)	(43.91)	(45.81)	(45.12)

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PROBIT	
Base outcome : *Cohesive (active network)*	
Extended potential network	-0,13
	(0.09)
Gender	-0,10
	(0.08)
Age	-0,01**
	(0.00)
Education (*ICFES*)	0,00
	(0.15)
Education (*Techno*)	-0,13
	(0.14)
Education (*Univers.*)	0,20
	(0.15)
Married	-0,15
	(0.12)
Strata 2	0,10
	(0.16)
Strata 3	0,13
	(0.15)
Strata 4, 5, 6	0,11
	(0.26)
Density (household)	0,03
	(0.09)
Intercept	0.61**
	(0.28)
Predict. obs.	0.633
LR χ^2	44.68***
AIC	1.312
Pseudo R^2 (McFadden)	0.0323
N	1049

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	Treatment groups				Control group	
	Restricted/Cohesive	Extended/Cohesive	Restricted/Opened	Extended/Opened	Untreated†	Total
Size (potential)	5.84	8.35***	6.00	8.93**	4.50***	6.09
	(8.14)	(10.62)	(7.30)	(12.25)	(8.15)	(8.81)
Mean pres.	44.13**	50.84***	44.67*	50.70***	47.71	46.64
	(9.95)	(3.96)	(10.01)	(4.15)	(10.65)	(9.64)
Total pres.	370.58***	840.85***	380.68***	818.20***	453.77*	488.41
	(168.94)	(110.43)	(172.94)	(119.33)	(262.56)	(258.92)
Reachability	31.27	35.21***	28.97*	34.91***	29.43	30.75
	(14.51)	(12.04)	(13.87)	(13.71)	(14.27)	(14.12)
Diversity	18.46**	20.74***	18.87*	20.51**	20.08	19.48
	(5.56)	(2.42)	(5.25)	(2.58)	(5.69)	(5.09)
Dissymetry	0.89**	1.06***	0.89	1.06***	0.95	0.94
	(0.83)	(0.60)	(0.98)	(0.68)	(1.10)	(0.93)
Numb. pos.	8.22***	16.64***	8.34***	16.24***	9.44	10.23
	(3.30)	(2.49)	(3.33)	(2.63)	(5.06)	(4.89)
Age (net)	42.09***	42.06***	36.57***	36.18***		38.56
	(11.67)	(10.85)	(10.34)	(10.35)		(11.08)
Density	0.73**	0.65	0.68	0.67		0.69
	(0.26)	(0.33)	(0.29)	(0.31)		(0.29)
Size (active)	1.77	2.12***	1.80	1.95		1.85
	(1.01)	(1.17)	(1.08)	(1.06)		(1.08)
High freq. (%)	75.11***	66.57	62.11**	62.11		65.99
	(39.04)	(40.52)	(43.18)	(40.78)		(41.76)
High trust (%)	59.61***	59.55***	33.41***	45.16		45.09
	(44.02)	(41.31)	(41.25)	(43.08)		(43.88)
High rec. (%)	58.87***	57.16***	33.32***	45.64		44.67
	(44.25)	(41.85)	(41.21)	(42.25)		(43.71)
Duration (mean)	283.07***	263.79***	69.47***	72.08***		147.20
	(115.43)	(109.53)	(48.69)	(45.94)		(127.63)
Family (%)	69.90***	57.94***	18.76***	18.09***		36.33
	(41.21)	(42.41)	(33.71)	(32.67)		(43.41)
Friends (%)	22.44***	32.99***	56.72***	61.35***		45.92
	(36.18)	(40.07)	(43.51)	(42.56)		(44.12)
Geo. prox. (%)	27.22***	18.16	11.75***	9.82***		16.17
	(41.41)	(35.53)	(28.20)	(25.80)		(33.31)
Neighborhood (%)	18.72***	17.26***	26.99**	23.81		23.23
	(35.10)	(32.66)	(39.41)	(36.55)		(37.30)
City (%)	47.54	57.78	54.54	58.84		53.80
	(45.20)	(43.00)	(44.42)	(42.42)		(44.27)
Same gen. (%)	71.17	68.76	70.11	63.94**		69.21
	(40.23)	(34.68)	(42.42)	(38.80)		(40.62)
Same inc. (%)	28.05	22.88***	33.96***	26.73		29.98
	(40.23)	(34.68)	(42.42)	(38.93)		(40.62)
Same edu. (%)	39.98**	50.28	42.21	55.89***		44.80
	(44.30)	(42.08)	(45.59)	(45.40)		(45.14)

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Appendix

	Job search		*Job matching*			
	Time to find		**Income mobility**		**Job satisfaction**	
ATET						
Restricted/Cohesive	**-0.09****	(0.04)	0.05	(0.04)	0.02	(0.04)
Extended/Cohesive	**-0.12****	(0.05)	-0.08	(0.05)	**0.14****	(0.06)
Restricted/Opened	-0.00	(0.04)	-0.05	(0.04)	0.02	(0.03)
Extended/Opened	0.04	(0.06)	**-0.10***	(0.05)	0.01	(0.05)
Control network (*potential outcome mean*)	0.47	(0.03)	0.47	(0.03)	0.28	(0.03)
Individual characteristics						
Gender	✓		✓		✓	
Education	✓		✓		✓	
Married	✓		✓		✓	
Age	✓		✓		✓	
Age^2 (*last step*)	✓		✓		✓	
Household characteristics						
Stratum	✓		✓		✓	
Density (household)	✓		✓		✓	
Employment characteristics						
Sectors	✓		✓		✓	
Experience (last step)	✓		✓		✓	

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