# Moving to opportunity through coworker networks

*Keywords: migration, coworker networks, information, labor market segmentation, economic geography*

## Extended Abstract

High regional inequalities are a striking feature of many countries. In France, dispersion of wages and unemployment risk across local labor markets remains high (Bilal, 2023). While migration between regions is an important phenomenon,[1] data shows that it is skill-biased: high-skilled workers are more likely to move, they move further and between the largest cities. The literature has emphasized high barriers to mobility limiting migration, especially among low-skilled workers (Schmutz et al, 2021). One example of such barriers are information frictions, and in particular those arising from the presence (or lack) of social networks in different cities. Evidence shows that half (or more) of all jobs is found through personal or informal contacts (Topa, 2011). These social networks are much less developed in different cities[2] and thus represent an important type of migration friction.

What is the role of social networks for accessing information on job opportunities in other cities? Is there inequality in access to information and does it matter for inequality in economic outcomes? To address these questions, I use French matched employer-employee data to build an individual-specific and time-varying network based on coworkers that have moved to new firms and to different commuting zones (CZs). These past coworkers connect each individual to new job opportunities, both local and in other cities.[3] The dataset follows the quarterly job histories of all private-sector employees between 2005 and 2019 in mainland France.

Firstly, I study the role of coworker networks in migration decisions. I find that they are important for supporting mobility to connected cities and in reaping the long-term income benefits of migration. A one standard deviation increase in the share of coworkers in non-local CZs increases the migration probability to connected cities (i.e. where a worker knows at least one former coworker) by 0.05 percentage points, which is 260% of mean migration (Table 1). Moreover, the presence of local networks affects the choice of destination city (Table 2): the probability of choosing a given CZ increases from 0.6% to 22.1% when the share of local connections increases from the 1st to the 9th decile of the distribution (Figure 1). At the same time, while migration has a positive effect on long-term income, this effect is magnified by the presence of local networks (Table 3).

Secondly, I compare the role of networks among low- and high-skilled workers and show that, while low-skilled workers generally migrate less and have fewer connections to non-local labor markets, these connections have also a weaker impact on their probability of migration (Table 4). Moreover, labor market segmentation between high- and low-skilled workers may

[1] In France, migration accounts for 31% of job-to-job transition. This figure is based on French matched employer-employee data for 2010, for males that are either high- or low-skilled. High-skilled workers are defined as white-collar workers, or "cadres" (CS1 = 3 in the French occupational nomenclature), while low-skilled workers are blue-collar workers, or "ouvriers" (CS1 = 6).

[2] Around 30% of social connections are in non-local commuting zones (CZs).

[3] For each worker, I identify colleagues with whom she has worked with in the past 12 quarters. Individuals are defined as colleagues if they have worked in the same plant. I then focus on those that have changed job and moved to a new firm, whether in the same or in a different CZ.

imply that the latter group is less likely to receive information about good job opportunities, especially when job-to-job transitions involve a migration decision. For low-skilled workers, the presence of non-local networks dampens the positive effect of migration on long-run wages (Table 3).

My empirical analysis thus suggests that networks provide important information on job opportunities, which is especially important when making migration decisions. However, the geographical dispersion of coworker networks is skill-biased, which implies that some (high-skilled) workers are more likely to hear about non-local job opportunities. At the same time, labor market segmentation means that low-skilled workers are less likely to receive information about good non-local job opportunities, as the quality of their networks may be lower than that of high-skilled workers. Networks may thus be a double blessing for high-skilled workers, but counterproductive for low-skilled workers.

**Relationship to the literature -** The quantitative economic geography has long studied mobility between local labor markets (Blanchard and Katz, 1992; Schmutz & Sidibé, 2019). However, this work has not considered an explicit information channel, despite the fact that the role of information frictions in migration has been shown to be large (Wilson, 2021; Gharad et al, 2014). While the literature looking at this channel is informative, it however focuses on narrow settings, such as the impact of news about opportunities related to the US fracking boom (Wilson, 2021), or a randomized control trial in Bangladesh (Gharad et al, 2014).

Other recent work has highlighted the fact that information transmission often takes place through social networks, and in particular that the role of coworkers is significant in providing information on job opportunities (Caldwell and Harmon, 2019). This literature has so far not considered the role of these information channels for migration. My paper aims to bridge the literature on migration, information frictions and the role of social networks, by shedding light on how inequality in access to information affects migration decisions and long-term economic outcomes, potentially exacerbating pre-existing diverging trends across the skill distribution of workers.

# References

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| | Migration in next quarter | | | Connected CZ | Unconnected CZ |
|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) |
| Coworkers in non-local CZ (ratio) | 0.0099 (0.0001) | 0.0063 (0.0001) | 0.0063 (0.0001) | 0.0013 (0.0001) | 0.0050 (0.0001) |
| 1std. dev. increase in % coworkers in non-local CZ | 0.3873 | 0.2482 | 0.2482 | 0.0520 | 0.1963 |
| Divided by mean migration | 161% | 103% | 103% | 260% | 89% |
| Total coworkers | Yes | Yes | Yes | Yes | Yes |
| Log CZ density & workplace characteristics | Yes | No | No | No | No |
| Worker & job characteristics | Yes | Yes | Yes | Yes | Yes |
| Individual FE | Yes | Yes | Yes | Yes | Yes |
| Workplace x quarter FE | No | Yes | Yes | Yes | Yes |
| Sector x quarter FE | No | No | Yes | Yes | Yes |
| Adjusted R-squared | 0.0199 | 0.6073 | 0.6073 | 0.4503 | 0.6210 |
| Number of observations | 14,229,062 | 13,181,466 | 13,181,124 | 13,181,124 | 13,181,124 |
| Number of individuals | 3,661,460 | 3,397,091 | 3,396,993 | 3,396,993 | 3,396,993 |

***Table 1:*** *The regression table shows the results of a linear probability model estimated by ordinary least squares (OLS). The model regresses a migration dummy in the next quarter on the ratio of coworkers in non-local CZs, on the number of total connections (coworkers) and on a series of CZ, workplace, worker and job characteristics as well as individual, (origin) workplace-by-quarter and (origin) sector-by-quarter fixed effects. The CZ and workplace characteristics include CZ working-age population density, workplace size, mean quarterly salary, ratio of female employees. The worker characteristic is age. Job characteristics are tenure in the workplace, a dummy for whether the job is fixed-term, a dummy for whether the job is part-time. Columns (1)-(3) examine migration to either connected or unconnected CZs, column (4) focuses on migration events to connected CZs, column (5) to unconnected CZs. Connected CZs are those where the worker knows at least one former coworker, who has moved there. Results are based on the quarterly panel for 2010, for males that are either high- or low-skilled. The first row shows the coefficient of interest, i.e. the effect of having a higher ratio of former colleagues currently working in non-local CZs. Standard errors are reported in brackets. The next row multiplies the coefficient by a 1 standard deviation increase in the % of coworkers in non-local CZ, to better assess the magnitude of the effect. The third row divides the latter result by mean migration, to show how the impact of networks on the probability of migration relates to actual migration rates (which in the data are rare events).*

| | Migration to CZ | | | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| Coworkers in destination CZ (%) | 0.0445 (0.0000) | 0.0234 (0.0003) | 0.0046 (0.0004) | 0.0037 (0.0004) |
| CZ distance | No | Yes | Yes | Yes |
| Log Density (dest.) | No | No | Yes | Yes |
| % Managers, % College educated (dest.) | No | No | No | Yes |
| Pseudo R-squared | 0.0302 | 0.1542 | 0.2410 | 0.2543 |
| Number of observations | 9,648,800 | 9,648,800 | 9,648,800 | 9,648,800 |

***Table 2*** *The regression table shows results of a location choice model estimated using a conditional logit estimator with worker fixed effects. Results are based on the quarterly panel for 2010, for individuals (males, either high- or low-skilled) that make one migration in 2010. The model estimates the effect of the share of coworkers in each potential destination CZ on the probability of migrating to that CZ. Controls refer to the destination CZ. Standard errors are reported in brackes.*

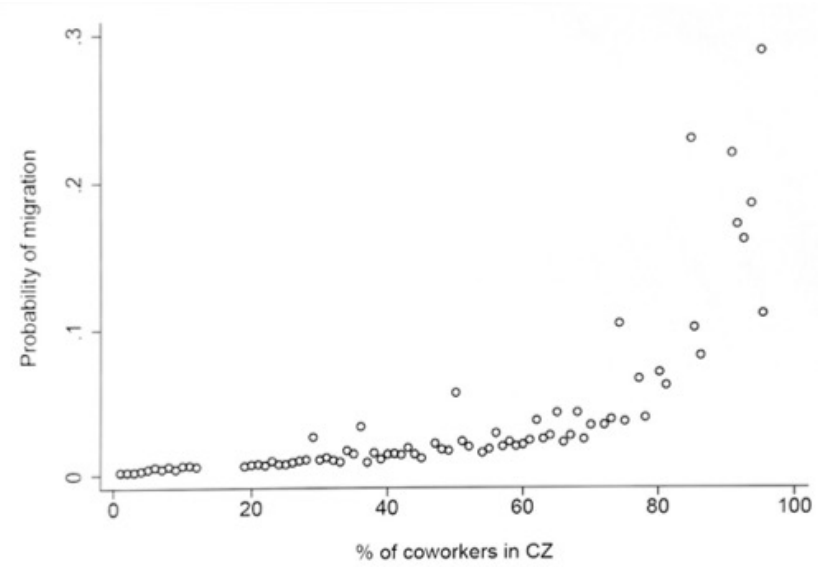


***Figure 2:*** *Predicted probability from location choice model estimated with a conditional logit model (with worker fixed effects and robust standard errors). Predicted probabilities are calculated from the results of model (4) in Table 2. The model is estimated conditioning on the following controls: distance between origin and destination CZs, log working-age population density of destination CZ, % of managers and % of college-educated workers in destination CZ. The figure depicts the mean probability of choosing a specific CZ as migration destination by the percentile of the distribution of the % of coworkers in each location.*

| | Delta Yearly Salary (2019-2010) | | | | | |
|---|---|---|---|---|---|---|
| | All workers | | Low-skilled | | High-skilled | |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Migration dummy | 697.61<br>(50.10) | 562.88<br>(61.86) | 614.74<br>(62.98) | 913.21<br>(75.12) | 230.51<br>(148.46) | -78.88<br>(189.66) |
| CZ FE | Yes | Yes | Yes | Yes | Yes | Yes |
| 2010 characteristics | Yes | Yes | Yes | Yes | Yes | Yes |
| Non-local coworkers (ratio) | No | -193.77<br>(22.92) | No | 558.27<br>(24.29) | No | 77.76<br>(90.81) |
| Migration dummy x Non-local coworkers (ratio) | No | 464.82<br>(121.91) | No | -919.38<br>(153.48) | No | 792.15<br>(364.09) |
| Total connections | Yes | Yes | Yes | Yes | Yes | Yes |
| Adjusted R-squared | 0.0597 | 0.0597 | 0.0419 | 0.0424 | 0.0402 | 0.0403 |
| Number of observations / workers | 4,257,076 | 4,257,076 | 1,331,334 | 1,331,334 | 925,256 | 925,256 |

***Table 3:*** *The regression table shows the effect of migration on long-term changes in salary. The model is estimated by OLS. The migration dummy identifies whether an individual has migrated in 2009-2010. 2010 characteristics include worker, job and workplace characteristics in 2010. Worker characteristics are age, gender, a dummy for whether the individual is born in France, and a 3-level indicator for skill based on occupation. Job characteristics are whether the job is fixed-term and whether it is part-time. Workplace characteristics include workplace size, mean hourly wage and the share of female employees. Standard errors are reported in brackets.*

| | Low-skilled | | High-skilled | |
|---|---|---|---|---|
| | Connected | Unconnected | Connected | Unconnected |
| | (1) | (2) | (3) | (4) |
| Coworkers in non-local CZ (ratio) | 0.0007<br>(0.0000) | 0.0015<br>(0.0001) | 0.0022<br>(0.0001) | 0.0083<br>(0.0002) |
| 1 std. dev. increase in % coworkers in non-local CZ | 0.0273 | 0.0592 | 0.0839 | 0.3133 |
| Divided by mean migration | 273% | 37% | 210% | 95% |
| Total coworkers | Yes | Yes | Yes | Yes |
| Worker & job characteristics | Yes | Yes | Yes | Yes |
| Individual FE | Yes | Yes | Yes | Yes |
| Workplace x quarter FE | Yes | Yes | Yes | Yes |
| Sector x quarter FE | Yes | Yes | Yes | Yes |
| Adjusted R-squared | 0.5813 | 0.6895 | 0.3859 | 0.5714 |
| Number of observations | 8,564,695 | 8,564,695 | 4,206,100 | 4,206,100 |
| Number of individuals | 2,207,875 | 2,207,875 | 1,084,894 | 1,084,894 |

***Table 4:*** *The regression table shows the results of a linear probability model estimated by OLS, as in Table 1, but now distinguishing between high- and low- skilled workers. The model regresses a migration dummy in the next quarter on the ratio of coworkers in non-local CZs, on the number of total connections (coworkers) and on a series of CZ, workplace, worker and job characteristics as well as individual, (origin) workplace-by-quarter and (origin) sector-by-quarter fixed effects. The CZ and workplace characteristics include CZ working-age population density, workplace size, mean quarterly salary, ratio of female employees. The worker characteristic is age. Job characteristics are tenure in the workplace, a dummy for whether the job is fixed-term, a dummy for whether the job is part-time. Columns (1)-(3) examine migration to either connected or unconnected CZs, column (4) focuses on migration events to connected CZs, column (5) to unconnected CZs. Connected CZs are those where the worker knows at least one former coworker, who has moved there. Results are based on the quarterly panel for 2010, for males that are either high- or low-skilled. The first row shows the coefficient of interest, i.e. the effect of having a higher ratio of former colleagues currently working in non-local CZs. Standard errors are reported in brackets. The next row multiplies the coefficient by a 1 standard deviation increase in the % of coworkers in non-local CZ, to better assess the magnitude of the effect. The third row divides the latter result by mean migration, to show how the impact of networks on the probability of migration relates to actual migration rates (which in the data are rare events).*