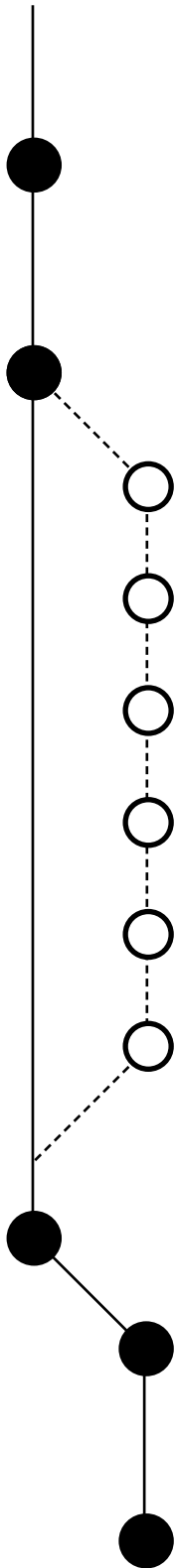


**BUDAPEST LABORATORY OF URBAN ECONOMICS**

**RESEARCH GROUP**

# CONTENTS





# INTRODUCTION

We collect data from several archival resources in order to build a unique dataset on the economy and social network of the capital of Hungary, Budapest, from the late 19th to the early 20th century. we acquire data of people, their social network and their businesses by processing housing and business registries, criminal records, municipal assembly proceedings etc. – all publicly available but not processed and compiled to be an input for empirical economic research, at least not up to this point. We do this because we believe that this rich dataset will be useful to address several open questions in urban economics. Though economics is a study of human interactions which are deeply affected by spatial relations, explicitly taking both social interactions and spatial patterns into account on a micro level is a relatively new strategy in economic theory and empirics.

The purpose of this document is to shortly summarize our research ideas and to give an insight into the data compilation process with some illustrations. We believe that our dataset will have several advantages compared to contemporary data. First, this era was far back enough in time so that no privacy concerns are raised by our data collection, but close (and modern) enough to admit comparison and drawing conclusions that hold even today. Second, those times, just like ours, saw revolutionary changes in technology, causing dramatical subsequent changes in business and private interactions. One can think of electricity, running water, telephone connection, tramways – all of these were introduced during this period. Meanwhile, Budapest saw massive investments in infrastructure as it turned from a medium sized town to one of the biggest metropolises in continental Europe just over forty years.

Constant change has become an integral part of the mindset of the 21th century human being, but it was not as self-evident for the late 19th one, so we can study how changes in access to technology, infrastructure and public services affect people's lives when these changes are largely unanticipated. Last but not least, we believe that the data people generate every day always have the potential to become an input for economic research, even when it is unintended. Perhaps even more so then.



# RESEARCH IDEAS



## AGGLOMERATION OF CRIMINALS

(URBAN ECONOMICS)

The fact that all cities have both relatively safer and more dangerous neighborhoods is known by everyone who has ever set foot in any of them. Urban economists have come up with several explanations for this robust empirical pattern, proposing either market size effects (criminals go where there are a lot of people to trick, rob, kidnap or kill), safety considerations (once there are a lot of thieves around a neighborhood, the probability for one of them to be caught is lower *ceteris paribus*) and “knowledge spillovers” among criminals (see Zenou 2003, Calvó-Armengol and Zenou 2004).

All of these explanations start from the experience that different types of crime tend to concentrate in one particular spot in a city. We propose an empirical test of the latter hypothesis by looking whether there is concentration of location of residence of people charged with one type of crime instead of concentration of the crimes themselves. We argue that while all three explanations would cause similar crimes to be committed at similar places, knowledge spillovers would also give an incentive to move close to each other. If controlling for neighborhood characteristics we can still see a pattern of agglomeration among these people, we will have found a more reliable empirical evidence on knowledge spillovers in crime.



## CHANGES IN AGGLOMERATION PATTERNS

(URBAN ECONOMICS, INDUSTRIAL ORGANIZATION)

We also study how the dynamics of co-agglomeration patterns change in general for various occupations during the period. Economists have long been interested by the spatial patterns of different industries. Why do some businesses tend to locate next to each other, while others look for places where there are no one else from their industries? There are differences in co-agglomeration patterns not just for businesses, but also places of residence of people of different occupations. In the spirit of Gabe and Abel (2010) we study how these patterns change over time given how the city itself changes – public transportation makes commuting less costly, public spaces create opportunities to exchange ideas with colleagues. The competitive edge of our data is that studies in this topic were very restricted by the fact that micro level worker datasets rarely have location of residence of the worker due to obvious privacy reasons. Also, the previously unknown means of public transportation acted as unanticipated shocks to market access, which will help us identify the underlying mechanisms which re-draw agglomeration patterns.



## NAME CHANGES AND CULTURAL ASSIMILATION

[IDENTITY ECONOMICS]

Our research focuses on the economic mechanisms behind the decision to assimilate. In particular, we study how the decision of late 19th – early 20th century workers to change their foreign-sounding surnames to Hungarian sounding ones affected their economic outcomes.

Economists and sociologists have long been aware that different identities of the individuals affect their choices and also their subsequent economic outcomes. This awareness, however, has not defined a research agenda up until recently, following the seminal work of Akerlof and Kranton (2000). Since then their ideas had a profound effect on research in economics of education (as in Fryar and Torelli 2010), international trade (Guiso, Sapienza and Zingales 2009) or economics of organization (Akerlof and Kranton, 2005).

Over the course of the 19th century, Budapest, the capital of Hungary turned from a mostly German-speaking city into a predominantly Hungarian one. This occurred through a very rapid assimilation of thousands of ethnic German, Jewish and Slavic citizens. The assimilation procedure happened in two or three steps: switching primary language in use, changing names and also religion (in case of the Jewish population). This procedure was voluntary, though largely supported by the state apparatus which struggled with the fact that ethnic Hungarians accounted only for a relative majority of the population of the Kingdom of Hungary. We want to see whether the decision to blend in into the cultural majority was motivated by a perspective of better economic opportunities (higher wages or higher demand for products). We identify this effect by using exogenous variation in peer pressure (in space and time) and public policy pressure (in time) in the decision to change names.



## AC / DC

[INDUSTRIAL ORGANIZATION]

We study how access to different sources of electricity made available by competing technologies affected firm performance in the early stages of modern urban development. Using exogenous variation in access to either alternating or direct current in the late 19th century Budapest, we hope we will be able to decide whether the final triumphant between the two was actually the better for the local economy.

People are tempted to think that technology is similar to evolution in the sense that between two substituting technologies the one which is more effective will eventually take over. The fact that innovators sometimes put so much effort not just into the innovation process itself, but into thrashing their opponents directly,

suggests that the story is not that simple. It might very well be the case, that when competing technologies are initially very similar in perceived efficiency, the latter “opponent thrashing” activity will decide who will be the final victor.

One such a bitter fight between innovators is known in history as the “War of Currents” between advocates of direct current (mainly Thomas Edison) and alternating current (George Westinghouse) as a power distribution technology. By now AC technology is used almost exclusively in power grids around the world, but for 19th century observers this was not at all obvious. This motivated the city council of Budapest when they gave out two simultaneous concessions for building the Budapest power grid: one company was instructed to build a grid with alternating current, the other had to serve direct current. The two cables ran next to one another, odd street numbers having access to one type of current, even numbers having access to the other. We study how this affected the 5-,10-,20-year survival rates of existing firms and the location choices of newborn firms over the next decades.



## IT AND PERSONAL INTERACTIONS: COMPLEMENTS OR SUBSTITUTES?

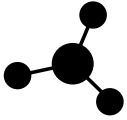
[URBAN ECONOMICS]

In the era of the Internet and social networking, it became widely known that the rapid growth of IT reduces the cost of communication, greatly reducing social and physical distance. The reason why cities exist is that people can interact at a relatively lower cost due to living close to each other. IT development reduces this competitive edge of cities, since people can exchange information from a distance almost as effectively as personally. We look at this empirical prediction and the contradicting one of the theoretical paper of Gaspar and Glaeser (1998) who argue that IT development complements social interactions, so one becoming easier to access, the consumption of the other will also increase.

By being able to map out the dynamics of the social network of the urban elite of the late 19th, early 20th century Budapest, we can test the hypothesis whether access to a revolutionary information technology equipment (namely, the phone) increases the connectedness of the individual. The hypothesis that IT development eliminates personal contacts suggests that access to the phone will reduce the likelihood of becoming a member of a civic association.

Since phones were expensive and thus the decision to install one is driven largely by selection, we look at social connectedness of the individuals who did not install it, but became exposed to the new technology through a neighbor. The advantage of this historical perspective is that switching from a zero-IT regime (where the two forms of communication were personal interaction and handwritten letters)

to the one where phones are available is arguably more dramatic than experiencing further development of the means of communication. Contrary to the revolution brought forward by the telephone, these later changes were also largely anticipated by the public.

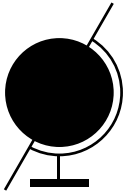


## SOCIAL NETWORK AND LABOR MARKET

(LABOR ECONOMICS, SOCIAL NETWORKS)

In the era of the Internet and social networking, it became widely known that the fact that certain groups of people and economic opportunities tend to agglomerate is well known, as it is also well known that they often agglomerate in different places. Some people end up living where there are businesses, jobs, access to education, while some others end up living in disadvantaged areas and peripheral districts. While it is obvious that city centers are where people meet, work, exchange ideas, and so forth, it was not until the model of Zenou (2013) that the mechanism between decisions on place of residence, employment and social connections were studied formally. The model theorized that the benefit of living in the core of the city (where the jobs are) is higher for well connected people, so they will tend to move to the city center. Our logic goes the other way around: what happens to job opportunities, if all of a sudden people have more chance to meet and form social ties?

We observe several outcome variables which we can associate with the individual's success on the labor market, namely public sector employment status, small business ownership and also, as a measure of labor market failure, the fact if someone gets arrested for any crime. We assess how these outcome variables change given the number of connected people increase in the neighborhood, instrumenting this change with regulatory changes concerning public- and semi-public spaces (parks and cafés).



# DATA AND VISUALIZATION

Our data comes from various databases of the Budapest Archives and the Ervin Szabó Metropolitan Library. Sources include the Budapest Housing Registry, a book published between the late 1870s to the 1920s. It is much more than a list of people and apartments, it contains the complete list of businesses, associations, even the list of artisans and data on basically everyone on a public payroll. We also make use of the so called “registry of captives” of the main Budapest courthouse containing detailed info on everyone who has been arrested in that period, and several other minor sources of information.

The main problem is that these data are just OCR-ed texts, lacking any particular database-like structure, so there is a lot to do before any empirical investigation can be performed on them. We are currently developing standardized tools to process these texts, so the illustrations below are very preliminary.

The data cleaning process roughly goes as follows: the residence registry part is used to identify individual people, their jobs and their addresses. Having obtained the list of people this way, it is a standard named entity recognition task to identify which businesses and civic associations they participate in, which positions they hold, which real estate they own. All entities (businesses, associations, people) have addresses – the 19th century addresses are matched with they contemporary counterparts which then can be easily geocoded. We repeat this task for all years and data sources and then link people using name, address and occupation.

## THE RAW DATA

To get a hint of the magnitude of the workload, have a look at how this data looked like originally:



## DATA AND VISUALIZATION

---

### OCCUPATIONAL AGGLOMERATION

Here you can see some preliminary visualizations of our data. First, occupational agglomeration patterns can be seen in the first two of the maps. You can see that while administrative workers have no particular co-agglomeration patterns, carriers or cab-drivers tend to live in one particular part of the city. (Note that we only list administrative workers whose family name starts with either A or B because there are so many of them that nothing would be visible otherwise. )

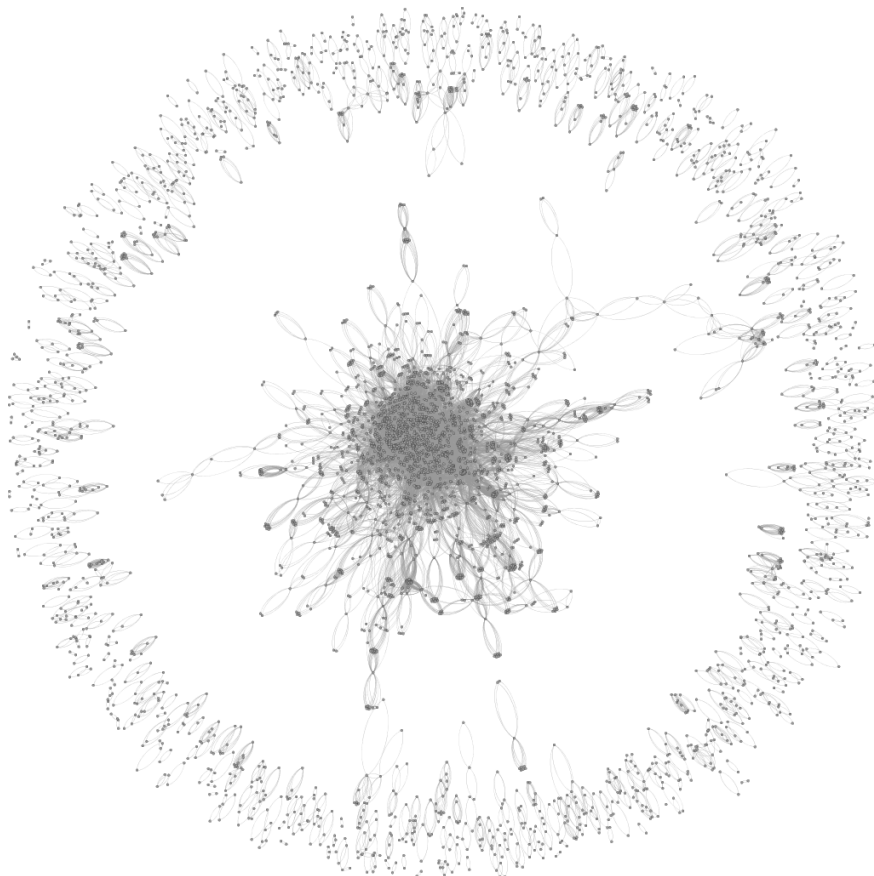
[https://mapsengine.google.com/map/edit?mid=z\\_UCZ8pFuSRU.kflnhXGADTXQ](https://mapsengine.google.com/map/edit?mid=z_UCZ8pFuSRU.kflnhXGADTXQ)

[https://mapsengine.google.com/map/edit?mid=z\\_UCZ8pFuSRU.km7ezY2vqBW8](https://mapsengine.google.com/map/edit?mid=z_UCZ8pFuSRU.km7ezY2vqBW8)

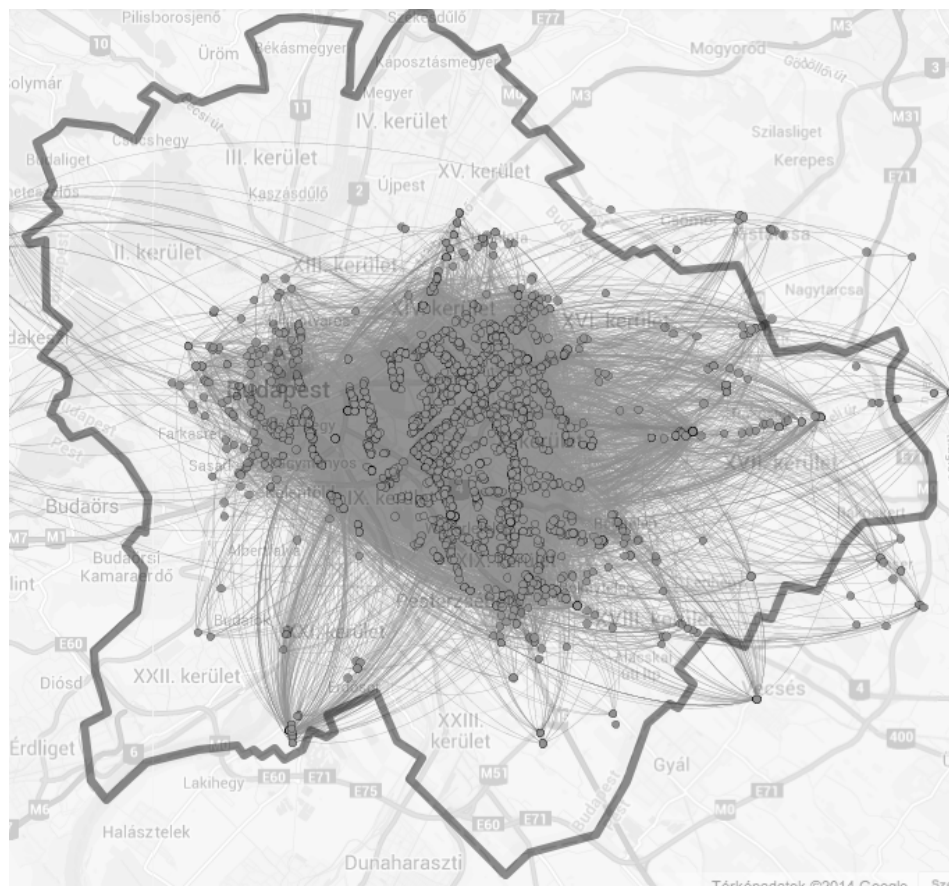
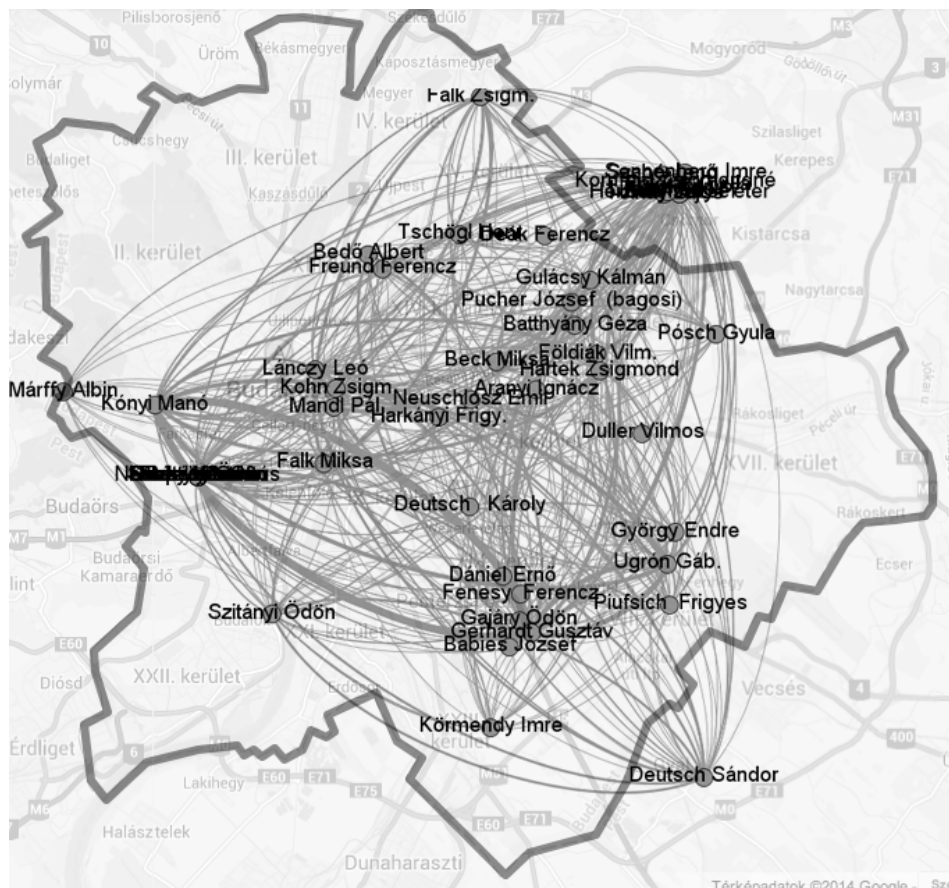
### SOCIAL NETWORKS

The link takes to a map with the addresses of socially connected people. This shows a very intuitive core-periphery pattern: the best connected people live in the city center. There is also a very strong core-periphery pattern in terms of social structure, not just geographical position: there is a very densely interconnected core of people and a fringe consisting of individuals with 1 or 2 connections at most. One interesting thing is that the core and the periphery are connected through relatively few paths. The penultimate graph put the most connected people with names on a map, while the last one shows all connections within Budapest.

[https://mapsengine.google.com/map/edit?mid=z\\_UCZ8pFuSRU.kWmTImXuDQF4](https://mapsengine.google.com/map/edit?mid=z_UCZ8pFuSRU.kWmTImXuDQF4)



## DATA AND VISUALIZATION



### CRIME

Criminal agglomeration patterns are visible on the next map. We show three separate layers: theft is more prominent, and it is also striking that on a given street there are either a lot of thieves or there are basically none of them. The story is different for what we could call „sophisticated” crimes (fraud, counterfeiting money etc.). While there are few of them, they are quite dispersed all over the city. Aggressive crimes (such as murder or rape) are showed in order to see crimes which are supposedly not subject to knowledge spillovers, but give an insight about the overall dangerousness of a neighborhood. It is interesting that thieves are all over the place, not just in the shady parts of the city.

[https://mapsengine.google.com/map/edit?mid=z\\_UCZ8pFuSRU.kzPoRmU-TT18](https://mapsengine.google.com/map/edit?mid=z_UCZ8pFuSRU.kzPoRmU-TT18)



## ABOUT US



### RITA PETŐ

Rita Pető holds a Master of Arts degree in Economics from Central European University (CEU, Budapest). Currently she is a 2<sup>nd</sup> year PhD student at the Department of Economics of Central European University. Apart from her research activity she has been a teaching assistant in Microeconomics at Eötvös Loránd University and worked as a research assistant for CEU's MicroData and Labor Project research groups. Her research interests are international trade and urban economics.



### ATTILA GÁSPÁR

Attila Gáspár holds a Master of Arts degree in Economics from Central European University (CEU, Budapest) and a Master of Arts degree in Political Science from Eötvös Loránd University (ELTE, Budapest). Currently he is a 2<sup>nd</sup> year PhD student at the Department of Economics of Central European University. He has teaching experience in econometrics and mathematical methods for economists, and has been working in several empirical research projects at CEU. His research interests include urban, network and labor economics.



# LIST OF PAPERS CITED IN THIS DOCUMENT

Abel, Jaison R. and Todd M. Gabe. „Specialized knowledge and the geographic concentration of occupations.” *Journal of Economic Geography* (2012) 12 (2): 435-453

Akerlof, George A., and Rachel E. Kranton. “Economics and identity.” *The Quarterly Journal of Economics* 115.3 (2000): 715-753.

Akerlof, George A., and Rachel E. Kranton. “Identity and the Economics of Organizations.” *The Journal of Economic Perspectives* 19.1 (2005): 9-32.

Calvó-Armengol, Antoni and Yves Zenou. „Social Networks and Crime Decisions: the Role of Social Structure in Facilitating Delinquent Behavior.” *International Economic Review*, Volume 45, Issue 3, pages 939–958, August 2004

Fryer Jr, Roland G., and Paul Torelli. “An empirical analysis of ‘acting white.’” *Journal of Public Economics* 94.5 (2010): 380-396.

Gaspar, Jess, and Edward L. Glaeser. “Information technology and the future of cities.” *Journal of urban economics* 43.1 (1998): 136-156.

Guiso, Luigi, Paola Sapienza, and Luigi Zingales. “Cultural biases in economic exchange?” *The Quarterly Journal of Economics* 124.3 (2009): 1095-1131.

Zenou, Yves. „The Spatial Aspects of Crime.” *Journal of the Economics Association*, Volume 1, Issue 2-3, pages 459–467, April-May 2003

Zenou, Yves. “Spatial versus social mismatch.” *Journal of Urban Economics* 74.C (2013): 113-132.