Essays on Social Capital and Economic Activity

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by

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Abstract

This thesis comprises three essays on social capital including social distance, social trust and social interaction and explore how they affect the economic activity. Chapter 1 investigates the relationship between social distance and the process of capital accumulation. We show that social distance and the current capital stock are jointly determined and both are critical for economic growth. Economies at a similar stage of economic development, but different in terms of perceived social distance may experience strikingly different long-term prospects. Equally important, however, the likelihood that countries which are similar in terms of perceived social distance may yet experience drastically opposite socio-economic paths if they differ in terms of their economic conditions. In the second chapter, I provide a systematic attempt at the construction of such an alternative measure of trust. Methodologically, I use the Factor Analysis technique in order to assign weightings to all the various characteristics that are generally considered as determinants of generalised trust. These variables are also consistent with a variety of existing empirical evidences and theoretical studies. Consequently, the ranking of countries in trust index is more consistent with people's perception of trust ranking than the ones in the trust survey. Next, I add to the literature by illustrating with a panel study the effect of trust on FDI inflows as well as income inequality. In the third chapter, I explore the correlation between social interactions and labour market outcomes. I use active group membership, which describes the sum number of groups that individuals currently are active in, as the proxy of social interaction. Various specifications show that a higher level of social interaction is associated with increased probability of labour market participation. Furthermore, I extend to measure the effect of social interaction on wages.

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Declaration

Chapter 1 entitled "Social Distance and Economic Growth" is a joint work with Dr. Dimitrios Varvarigos, University of Leicester. The earlier version "Social Interactions, the Evolution of Trust, and Economic Growth" has been published in the 2015 University of Leicester Discussion Paper Series in Economics.

Contents

List of Figures

List of Tables

Introduction

Social capital, one of the central topics in current social science research, has been viewed as an important determinant of economic activity. The first concise definition of social capital is given by Bourdieu (1983) – "social capital is the aggregate of the actual or potential resources which are linked to possession of durable network of more or less institutionalised relationships of mutual acquaintance and recognition". However, it is the work of Putnam *et al.* (1993) that makes social capital as a popular focus for social science and economic research. They define social capital as "those features of social organisation, such as networks of individuals or households, and the associated norms and values that create externalities for the community as a whole". Fukuyama (1995) identifies trust as social capital and emphasises its function. He suggests the definition as "trust acts like a lubricant that makes any group or organisation run more efficiently". In recent decades, the role of social capital in economic activities has attracted significant attention. Indeed, Isham *et al.* (2002) reveal that the citations of 'social capital' increase dramatically from lower than 10 in 1990s to 153 in 2000 in the Econlit database. Yet, there are different definitions of 'social capital'. Nevertheless, in general, the definition is one or the combinations of the following terms: cooperative norms (Coleman 1988; Putnam *et al.* 1993; Knack and Keefer 1997; Putnam 2000; Woolcock and Narayan 2000), trust (Putnam *et al.* 1993; Knack and Keefer 1997) and social networks (Putnam *et al.* 1993; Putnam 2000; Woolcock and Narayan 2000; Sobel 2002).

Social capital with the aforementioned features can be seen as facilitating various aspects of economic activity. At first, Coleman (1988) suggests social capital can effectively boost human capital by illustrating how the parental involvement ameliorates student's achievement. Moreover, Knack and Keefer (1997) emphasise social capital could facilitate the enforcement of contracts as well as enhance the provision of public goods (by cooperative norms) and reduce transaction costs, which eventually improves economic outcomes. In addition, Putnam *et al.* (1993) argue that social capital can strength the governance by investigating the institutional environment of twenty Italian regional governments across north and south. Furthermore, Durlauf and Fafchamps (2004) point out that social capital facilitates social exchange efficiency via information transmission through social interactions. Finally, Rothstein and Uslaner (2005) propose that trust, as an element of social capital, can mitigate the economic inequality and promote social solidarity since trust enhances the belief of sharing the same fate as others.

Indeed, social capital can encourage mutual approach and interactions that facilitate social trust, integration and social cohesion, thus can have major economic consequences. This thesis adds to the literature by exploring how social distance, trust and social interaction affect economic activity.

The first chapter sheds light on the social distance and economic development nexus. We present a model where the dynamics of social distance and the process of capital accumulation are jointly determined. Social distance evolves intergenerationally, as the process of social interactions with people from different backgrounds creates experiences that are bequeathed to the next generation, thus shaping their perceptions and opinions about 'outsiders'. The provision of public goods and services is also a supporting factor towards a narrower social distance. A key result is the possibility of fractionalisation if social distance is above a critical threshold. As a result, long-run equilibria are path-dependent. Both the current social distance and the current stock of capital are important in determining the economy's long-term prospects.

The second chapter focuses on constructing a new trust index and investigating the effect of trust on economic performance variables such as FDI inflows and income inequality. It firstly critically reviews the current various measures of trust like surveys/questionnaires and experiments. In fact, the trust results produced by surveys and experiments are ambiguous. It is also argued that trust survey question may measure the behaviour of trust but not trustworthiness (Fehr *et al.* 2002). It motivated me to construct a trust index by considering the indicators of trust including social and institutional characteristics as well as education and socioeconomic conditions.

Methodologically, I use the Factor Analysis technique in order to assign weights to the determinants of trust. The trust index is compiled after combining these weights with the data measurements of the various components including: (i) the level of corruption and bureaucratic quality; (ii) law and order; (iii) investment profile; (iv) religious and/or ethnic tensions; (v) socioeconomic conditions; (vi) internal conflict; (vii) secondary school enrolment, among others. These components are also consistent with the theory work of Zak and Knack (2001) who show that trust is affected by institutional, economic and social environment. Consequently, the ranking of countries in trust index is more consistent with people's perception compared to the rankings of existing trust measures. Using the above, I examine the influence of trust on FDI inflows and income inequality on the sample of 139 countries over the 31-year period from 1984 to 2014. The results show that trust plays a significant role on FDI inflows for both OECD and non-OECD countries. Also trust can effectively mitigate the income inequality particularly for OECD countries.

In the third chapter, I explore the effect of social interaction on labour market outcomes such as employment status and wages by using longitudinal data from BHPS. Social interaction is proxied by the active group membership, which contains the sum number of groups that individuals currently are active in. Various identification strategies provide robust evidence that a higher level of social interaction results in increased probability of being in full-time employment. The influence of social interaction is more effective among females and this social interaction effect plays a significant role on individuals' labour market outcome at all age stage. Moreover, three social interaction indices have been constructed, each of them reflecting active membership in certain type of groups. Consequently, I find that active membership in professional organization and sports club are the most important for labour market participation. In terms of wages, social interaction shows a positive and statistically significant effect. The positive social interaction effect is more pronounced on wages among females. Nevertheless, social interaction shows no significant effect on wages when I consider differences in occupation types.

Chapter 1

Social Distance and Economic Growth

1.1 Introduction

Throughout the course of human history, societies have been composed of people who are heterogeneous in their racial, ethnic, linguistic, religious, cultural or political/ideological characteristics. Irrespective of the source of such heterogeneity however, its very presence evokes the significance of social distance (Park 1924; Bogardus 1925a) i.e., the perceived degree of remoteness which characterises the personal and social relations between members of different groups, thus determining their willingness to interact with each other. This is particularly important in circumstances when these 'others' are individuals who, having a different background in terms of the aforementioned characteristics, do not seem, on the outset, to share the same values, attitudes, or moral codes. For this reason, social distance is closely linked with the notion of trust. Indeed, increased social distance may discourage mutual approach and interactions that facilitate integration and social cohesion, thus increasing prejudice and reducing the level of trust among different groups of people – outcomes that can have major economic consequences. This view is supported by a plethora of experimental evidence suggesting that social distance discourages trust and, as a result, it can affect economic decision making (e.g., Rao and Schmidt 1998; Buchan *et al.* 2006; Fiedler *et al.* 2011; Etang *et al.* 2011; Binzel and Fehr 2013). Naturally, the possibility that social distance can have far reaching implications that permeate many facets of economic performance can be readily understood once we take account of its close conceptual association with the notion of trust, as well as the burgeoning literature that offers momentum to the idea reduced trust is a significant impediment to investment, productivity, and economic growth (e.g., Knack and Keefer 1997; Zak and Knack 2001; Dearmon and Grier 2009; Algan and Cahuc 2010; Tabellini 2010).

There are also equally intuitive arguments to suggest that differences in social distance and trust may also be, to some extent, symptomatic of differences in broader economic conditions. Bogardus (1967) cited the Great Depression as one of the main factors that did not allow social distance to narrow during that period; he also advocated the adoption of educational schemes as a means of ameliorating it. Butz and Yogeeswaran (2011) and Smith *et al.* (2014) have shown that social distance can be amplified as a result of adverse macroeconomic conditions and rising income/educational inequality respectively. In a similar vein, researchers have shown that increased levels of trust can be attributed to factors such as higher income, improved education, lower inequality, and increased spending on productive public services and infrastructure (e.g., Alesina and La Ferrara 2002; Delhey and Newton 2005; Bjørnskov 2006a).

If anything, the arguments that we have just summarised advocate the view that the relation between social distance and economic performance is two-way causal. Naturally, two-way causal effects are conducive to the existence of persistent differences in socio-economic outcomes. Insofar as reduced social distance fuels, and at the same time is fuelled, by economic conditions, then we can envisage circumstances where the current conditions may determine, to a great extent, the long-term prospects of the economy. On the one hand, we may have a vicious circle where social distance impedes economic performance which, subsequently, nurtures the attitudes that sustain the perception of remoteness among different groups, hence ingraining widespread mistrust into the fabric of society. On the other hand, there is the possibility of a virtuous circle whereby improved economic conditions are supportive to reduced social distance which, by itself, fosters productivity, economic growth and the overall standard of living.

The purpose of this chapter is to address and analyse these issues by focusing on the joint determination of social distance and economic development. We build a model where social distance and capital accumulation interact with each other, thus generating the joint evolution of their dynamics. Reduced social distance fosters productivity, thus increasing saving and accommodating the formation of capital through its positive effect on labour income. Social distance evolves by means of an intergenerational externality. Specifically, the current generation of adults engage in social interactions based on their inherited level of perceived social distance. These interactions generate experiences and form opinions that are bequeathed to the next generation, hence forming their perceived social distance. This process is also supported by the provision of public goods and services.[1] Two results prove critical for the co-evolution of economic development and social distance. Firstly, individuals optimally devote effort to initiate social ties with people that possess different characteristics, only if the perceived social distance is below an (endogenously derived) threshold. Secondly, the transition equation for social distance generates two equilibria below the aforementioned threshold; the one indicative of greater social distance is unstable and increasing in the stock of capital. In other words, economic development makes it more likely that, for given current conditions, social distance will become narrower over time. We show that the dynamic path that determines the economy's convergence to the long-run equilibrium depends on current conditions where both the existing degree of detachment among groups and the existing stock of capital play a key role. On the one hand, for given levels of economic development, the current conditions that determine social distance can be important in shaping the dynamic path of socio-economic outcomes. On the other hand, for given social distance, the dynamic path of such outcomes depends critically on the current stock of capital, thus highlighting the importance of economic conditions for shaping long-term prospects in terms of both economic and social characteristics. Put differently, the feedback that imbues the joint evolution of social distance and economic development can transform current imbalances among economies into permanent fixtures of their long-term characteristics.

[1] The view of social distance as a dynamic phenomenon is not alien to real world observations. On the contrary, using the Bogardus Social Distance Scale (Bogardus 1925b), a number of researchers have found changes in social distance over time (e.g., Payne Jr. *et al.* 1974; Parrillo and Donoghue 2005; Smith *et al.* 2014).

Our model is broadly related to other analyses that have endeavoured to elucidate the theoretical underpinning of the relation between economic activity and social distance. Akerlof (1997) introduced social distance into a variant of the gravity model as a means of discussing its implications on a variety of socio-economic decisions, whereas Gradstein and Justman (2002) used a dynamic model to show that a centralised system of public education can foster economic growth by reducing the social distance between two distinct groups of individuals, hence increasing the probability of successful economic transactions among them. Given the close conceptual association between social distance and trust, our analysis is, to some extent, also related to research that has directed attention to the possibility of path-dependencies on the relation between trust and economic development (e.g., Francois and Zabojnik 2005; Growiec and Growiec 2014).

Apart from the obvious differences in terms of both the set-up and the mechanisms that lead to the main results, other major differences of our model in comparison to the aforementioned analyses stem from our modelling of economic dynamics through an explicit process of saving and capital accumulation, as well as the explicit consideration of how the physical capital stock impinges on the formation of the social characteristic (in our case, social distance). These differences are not mere theoretical curios. On the contrary, there is an abundance of empirical research offering credence to the view that investment in physical capital is one of the most important contributing factors to the process of economic growth (e.g., De Long and Summers 1991; Mankiw *et al.* 1992; Bond *et al.* 2010). Therefore, the explicit analysis of the joint evolution of social distance with one of the fundamental determinants of the growth process is an endeavour worth undertaking, particularly given the lack of any previous systematic analysis on the issue. Equally important is the fact that the explicit consideration of the process of investment and capital formation allows us to emphasise a salient point: When considering the potential path of socio-economic outcomes, it is not only the current state of the social characteristic, but also the current state of the economy (in terms of the stage of economic development) that is crucial in dictating both the social and the economic prospects of a country – an outcome that, to the best of our knowledge, has eluded the attention of the existing literature on social distance, trust, and economic development.

The remaining analysis is organised as follows. In Section 1.2 we present the set-up of our economy and show the mechanisms that govern capital accumulation and the evolution of social distance. Section 1.3 analyses the dynamic equilibrium and discusses the main results. Section 1.4 shows that the main message from our analysis survives under an alternative specification for the economy's production technology. We summarise and conclude in Section 1.5.

1.2 The Economy

Consider an economy that is populated by an infinite sequence of overlapping generations of three period-lived individuals. The first period of each individual's lifetime is her childhood while the two subsequent periods are her youth (the first period of adulthood) and maturity (the second period of adulthood). Agents are active only during their adulthood. Although they are largely inactive during their childhood, it is the period where they form the set of personality traits (values, beliefs, attitudes etc.) that determine their perceptions on the degree of detachment that separates them from people who belong to a group with different characteristics, hence determining their willingness to interact socially with them.

The population mass of each age cohort is denoted $N > 0$ and is assumed to be constant over time. Once she reaches the first period of adulthood, each person is endowed with a unit of labour which she inelastically supplies to final good producing firms in exchange for the wage w_t. She pays (lump-sum) taxes T_t and then allocates her disposable income between consumption expenditures (denoted c_t) and saving (denoted s_t). The latter is deposited to financial intermediaries that return it next period, augmented by the (gross) interest rate R_{t+1}. The individual uses her saving in order to finance her consumption expenditures during maturity (consumption during the second period of adulthood is denoted d_{t+1}) – a period during which she does not have any labour endowment, therefore no other source of income other than the one that accrues from saving.

1.2.1 Social Distance and Social Interactions

In addition to the standard consumption-saving choice, individuals can also enjoy utility through social interactions with their peers. Particularly, young individuals build social ties with other members of their age group – ties that are retained over the lifetime and allow individuals to socialise. We are going to assume that the population is divided in two groups i and j. The former group has a population mass of $X<N$ while the latter group has a population mass of $N-X$. This distinction may capture characteristics such as racial, cultural, ethnolinguistic, religious, or ideological ones. These differences have no bearing on any of the economic characteristics of agents, i.e., their ability to perform labour, the rate at which they discount future outcomes etc. It only affects their attitudes towards socialisation.

Consider a person belonging to group i. This person can interact costlessly with a fraction $\pi \in (0,1)$ of individuals belonging to her own group, while each of these interactions yields $b>1$ units of utility.[2] She can also potentially initiate and establish a social tie with a fraction $p \in (0,1)$ of people belonging to group j. To minimise notation, we shall be making use of $p(N-X) \equiv \tilde{n}$ hereafter. Interactions with 'outsiders' are costly to initiate. Particularly, initiating a social tie with φ_t^i ($0 \le \varphi_t \le \tilde{n}$) individuals entails an effort cost that is captured by the function $\Phi(\varphi_t^i, m_t, \tilde{n})$. The variable $m_t \in [0,1]$ is a measure of the social distance between individuals who do not belong to groups that share common characteristics, thus they need to devote effort in order to approach and interact

[2] As it will become clear, $b>1$ is required for a meaningful solution to an individual's maximisation problem. Later we shall introduce a specific restriction on this parameter so as to guarantee a non-trivial dynamic equilibrium (see Assumption 1.3).

with each other. In this context, a higher value for the variable m_t is associated with narrower social distance. The effect of social distance on the effort function will be described shortly. With respect to the other argument, this function satisfies $\Phi_{\varphi_t^i} > 0$, $\Phi_{\varphi_t^i \varphi_t^i} > 0$, $\Phi(0, m_t, \tilde{n}) = 0$, $\lim_{\varphi_t^i \to \tilde{n}} \Phi(\varphi_t^i, m_t, \tilde{n}) = +\infty$ and $\Phi_{\tilde{n}} < 0$ (the latter assumption capturing the idea that is relatively easier to interact and/or socialise when the number of people with whom one can potentially establish a social tie is higher).

The perceptions that determine social distance are generated during an individual's childhood, thus they are taken as given once she reaches her adulthood. Furthermore, such perceptions affect the attitudes of individuals across different groups.[3] Social distance affects socialisation efforts as follows: Once established, an interaction with any of the φ_t^i individuals from group j yields the same units of utility that accrue from interactions with people who share common characteristics, i.e., b.[4] Nevertheless, a reduced social distance reduces the effort cost associated with initiating such ties. In other words, it is relatively easier to establish some type of relation with 'outsiders' when the social distance is narrower. These arguments may capture the idea that a narrower social distance reflects the willingness of individuals to approach people from different backgrounds, understand that their underlying differences should not be detrimental to their effort to communicate and share common goals and interests, thus inhibiting prejudice and intolerance. Recalling that higher m_t is indicative of reduced social distance, we capture these ideas through $\Phi_{m_t} < 0$, $\Phi_{m_t m_t} > 0$ and $\lim_{m_t \to 0} \Phi(\varphi_t^i, m_t, \tilde{n}) = +\infty$, the latter implying that it is prohibitively costly to initiate social ties with 'outsiders' if social distance is very high.

A specific functional form that satisfies all the aforementioned properties for the effort function, and therefore it shall be employed in our analysis, is given by

[3] Hence we abscond from the issue of differentiated social distance across different groups.
[4] Nothing will change qualitatively from our subsequent results, if we assume that the utility accruing from such interactions differs from the one corresponding to socialisation with people who are more akin to the individual who is establishing social ties.

$$\Phi(\varphi_t^i, m_t, \tilde{n}) = \frac{\tilde{n}\varphi_t^i}{(\tilde{n} - \varphi_t^i)z(m_t)}, \tag{1}$$

where the function $z(m_t) \in [0,1]$ satisfies $z'(m_t) > 0$, $z''(m_t) > 0$, $z(0) = 0$ and $z(1) = 1$.

1.2.2 The Individual's Problem

The objective of a young individual who belongs to group i is to choose her saving, which will also dictate her intertemporal consumption profile, as well as her socialisation effort in order to maximise her lifetime utility

$$u_t^i = (1-\delta)\ln(c_t) + \delta\ln(d_{t+1}) + b(x^i + \varphi_t^i) - \Phi(\varphi_t^i, m_t, \tilde{n}) \tag{2}$$

subject to $0 \le \varphi_t^i \le \tilde{n}$ and the budget constraints for youth and maturity that are given by

$$c_t = w_t - T_t - s_t, \tag{3}$$

and

$$d_{t+1} = R_{t+1}s_t, \tag{4}$$

respectively.[5] Note that the term x^i x^i captures the utility accruing from social interactions that the individual did not devote any effort to initiate and establish. It includes the number of social ties with people from her own group, i.e., πX, or even the ties with people from the other group that she was not the one to initiate. Furthermore, the parameter $\delta \in (0,1)$ quantifies the relative weight attached to the utility that accrues from consumption during the second period of the individual's adulthood.

Substituting (1), (3) and (4) in (2), we can express the individual's problem as follows:

$$\max_{s_t, \varphi_t^i} u_t^i = (1-\delta)\ln(w_t - T_t - s_t) + \delta\ln(R_{t+1}s_t) + b(x^i + \varphi_t^i) - \frac{\tilde{n}\varphi_t^i}{(\tilde{n} - \varphi_t^i)z(m_t)}. \tag{5}$$

In terms of optimal saving behaviour, this problem leads to the familiar solution

[5] The reason we do not use a superscript i on consumption and saving is because, as it will transpire later, these choices will not be affected by social traits.

$$s_t^* = \delta(w_t - T_t)\,, \tag{6}$$

i.e., young individuals will save a fraction of their disposable income in order to finance their future consumption needs. This fraction (corresponding to the marginal propensity to save) is equal to the preference weight that people attach to consumption during maturity. With regard to socialisation, it is straightforward to establish that the solution to the individual's problem results in

$$\varphi_t^{*,i} = \max\{0, [1 - \beta(\sqrt{z(m_t)})^{-1}]\tilde{n}\}\,, \tag{7}$$

where $\beta \equiv (\sqrt{b})^{-1}$. According to the result in Eq. (7), individuals will try to initiate social ties with a fraction $1 - \beta(\sqrt{z(m_t)})^{-1}$ of the total number $\tilde{n}$ of 'outsiders' with whom they can potentially interact. Given that $z'(\cdot) > 0$, it is obvious that this fraction is higher when social distance is narrower (i.e., it is increasing in m_t). In other words, reduced social distance will induce individuals to seek more social interactions with people who do not belong to the group of people with similar characteristics.

What is also important is the possibility of a corner solution that is embedded to the result in (7). With the purpose of illustrating this point and improving the clarity and analytical convenience of the subsequent analysis, without any significant loss of generality, henceforth we shall be making use of a functional form for $z(m_t)$ that satisfies all the properties that were outlined previously.[6] Particularly, for the remaining analysis we shall specify

$$z(m_t) = m_t^2\,. \tag{8}$$

Combining (7) and (8), we can express the optimal decision regarding φ_t^i according to

$$\varphi_t^{*,i} = \begin{cases} 0 & \text{if} \quad m_t \leq \beta \\ \left(1 - \dfrac{\beta}{m_t}\right)\tilde{n} & \text{if} \quad m_t > \beta \end{cases}. \tag{9}$$

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[6] The results remain qualitatively similar even without the specific function form in (8), as long as $z(m_t)$ satisfies the properties outlined in the main part of the analysis. We employ this function for analytical convenience and expositional purposes.

As it is obvious from this expression, individuals find it worthwhile to devote effort in engaging socially with 'outsiders' only if social distance is below a threshold characterised by the parameter term β (i.e., if $m_t > \beta$). If social distance is above this threshold then the utility benefit of such social interactions falls short of the effort cost that is necessary in order to initiate and establish them. As a result, an individual will opt to initiate interactions only with people who are more akin to her specific attributes.

It should be noted that, by analogy, the similar analysis and results apply for a person that belongs to group j. Assume that each individual can interact costlessly with a fraction π of people within her group, whereas initiating social interactions with a fraction p of people from group i requires effort. Denoting $pX \equiv \underset{\sim}{n}$ then the effort function is the same as in (1), after replacing $\tilde{n}$ with $\underset{\sim}{n}$ and φ_t^i with φ_t^j. The problem of this person can be described as[7]

$$\max_{s_t,\varphi_t^j} u_t^j = (1-\delta)\ln(w_t - T_t - s_t) + \delta\ln(R_{t+1}s_t) + b[x^j + \varphi_t^j] - \frac{\underset{\sim}{n}\varphi_t^j}{(\underset{\sim}{n} - \varphi_t^j)z(m_t)}.$$

It is straightforward to establish that the solution in (6) is the same while, after applying the function in (8), the optimal socialisation effort is summarised in

$$\varphi_t^{*,j} = \begin{cases} 0 & \text{if} \quad m_t \leq \beta \\ \left(1 - \dfrac{\beta}{m_t}\right)\underset{\sim}{n} & \text{if} \quad m_t > \beta \end{cases}. \tag{10}$$

The results in (9) and (10) indicate that unless social distance is below a critical threshold, there will be some form of fractionalisation in the sense that people will not form social ties with individuals from different backgrounds. This is a result that will prove important for the economy's long-term prospects, as we shall see later.

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[7] Consistent with the previous notation, x^j is meant to capture the utility from social interactions that did not entail any effort cost to the individual in the process of establishing them.

1.2.3 Firms and Production

Young individuals are employed by perfectly competitive firms (whose mass we normalise to one) who combine units of labour (denoted l_t) and capital (denoted K_t) in order to produce Y_t units of the economy's single commodity, by utilising a technology $F(K_t, l_t)$ such that $F_{K_t} > 0$, $F_{K_t K_t} < 0$, $F_{l_t} > 0$, $F_{l_t l_t} < 0$ and $F_{K_t l_t} > 0$. Furthermore, in line with the existing literature, we are assuming that, for given productivity variables, the technology displays unit constant returns, i.e., $F(xK_t, xl_t) = xF(K_t, l_t)$. For the purposes of our analysis, we shall be employing the following production technology:

$$Y_t = F(K_t, l_t) = \Theta_t l_t + K_t^{\eta}(A_t l_t)^{1-\eta}, \qquad \eta \in (0,1). \tag{11}$$

The term A_t introduces two external effects on production according to

$$A_t = H_t^{\lambda} G_t^{1-\lambda}, \qquad 0 < \lambda < 1. \tag{12}$$

The variable H_t is a learning-by-doing externality (see Frankel 1962, and Romer 1986), capturing the idea that workers gain knowledge and become more productive by handling more capital goods. Hence, following the existing literature, we shall assume that H_t is related to average stock of capital per person according to

$$H_t = Hk_t, \qquad H > 0 \tag{13}$$

where $k_t = K_t / N$. The variable G_t follows the existing literature (Barro 1990; Alesina and Rodrik 1994) by introducing the beneficial effect of productive public spending per capita on aspects such as education and research, infrastructure, health etc., aspects that can improve productivity. As it is customary in many models of economic growth, we are going to assume that government spending per person is measured relative to the economy's capital stock (e.g., Alesina and Rodrik 1994). Particularly, it is assumed that G_t is proportional to capital per worker according to

$$G_t = gk_t, \qquad 0 < g < 1. \tag{14}$$

Additionally, we shall consider the scenario where greater social distance entails costs to the economy in terms of a loss in productivity and output. This scenario may capture the idea that the amplification of the social distance between different groups of people with distinct identities/characteristics is conducive to prejudice and reduced trust, hence fuelling social tension, conflict and disorderly behaviour that can impede productivity both directly (e.g., rioting, crime etc.) and indirectly. Examples that can be associated with the indirect effects on productivity are either the psychological impact on the affected segments of the population (e.g., racial abuse, fear etc.) or the increased resources required to maintain some degree of law and order under such tense conditions. The empirically observed, negative relation between social distance and trust offers even more credence to these ideas, in light of the empirical analysis by Rodrik (1999): He uses the lack of trust as one of the components of social conflict and finds that the latter can explain, to a large extent, incidences of economic collapse. To introduce the supporting impact of a narrower social distance on productivity, we let $\Theta_t = \Theta(m_t)$ such that $\Theta'(m_t) > 0$. Specifically, we shall employ

$$\Theta(m_t) = \theta(1 - q + qm_t), \quad \theta > 0, \ 0 < q < 1. \tag{15}$$

At this point, we should note that our choice of production technology is made in order to guarantee analytical solutions throughout. In Section 1.4, we present an example with a more standard Cobb-Douglas technology where we show that the main results of our analysis remain qualitatively intact. This is because the absence of an impact from social distance to the marginal product of capital is innocuous in a model where logarithmic preferences imply that saving behaviour is not affected by the interest rate. However, in that case the transition equation for social distance becomes so complicated that it is not possible to obtain closed form solutions for one of the possible pairs of steady state equilibria.

Using Eq. (11)-(15) together with the labour market clearing condition $l_t = N$, we can solve the firms' profit maximisation problem according to which each input is paid its marginal product. Formally,

$$w_t = \theta(1 - q + qm_t) + (1-\eta)(H^{\lambda} g^{1-\lambda})^{1-\eta} k_t, \tag{16}$$

$$R_{t+1} = \eta(H^{\lambda} g^{1-\lambda})^{1-\eta} \equiv \hat{R} \ \forall t. \tag{17}$$

1.2.4 The Dynamics of Social Distance

We consider a scenario whereby the social interactions of a generation of adults create experiences that affect their perceptions on the qualities of individuals from other groups and their willingness to interact with them socially. The next generation of individuals are inculcated with these perceptions while developing the personality traits that shall ultimately determine social distance. We view this as a mechanism of intergenerational transmission of the characteristics that determine social distance, a mechanism that can describe either the vertical (i.e., ideas and beliefs passed on from parents to their offspring) or the oblique transmission (i.e., imitation of a role model; instruction by a religious or political leader) of opinions, beliefs, or other such traits. Particularly, the mechanism we propose works as follows. Individuals form their social ties with people from different backgrounds, based on the perceptions with which they were endowed. Once formed, these interactions will expose them to different characteristics, hence generating experiences that are conducive to increased tolerance. Such views and opinions are transmitted to the next generation of individuals when they form those attributes that shape their perceived social distance. Based on this, once the next generation reaches their adulthood, they will form their own social ties with people from different backgrounds and so on.

Furthermore, we shall assume that the government's resources, devoted to productive public spending, also have a positive external effect in the sense that they can improve the degree of tolerance and trust, hence shaping people's perceptions on social distance, in addition to the contribution to higher productivity to which we alluded earlier. Indeed, Delhey and Newton (2005) report evidence suggesting that such a positive effect can indeed stem from productive public expenditures (e.g., health and education), attributing it to the idea that such public services "generate a sense of citizenship and social trust" (Dehley and Newton 2005, p. 318). We may also appeal to other arguments that relate to the specific issue of public spending on education. For example, education improves social skills (Glaeser *et al.* 2000) and those cognitive skills that increase the levels of acceptance among segments of the population that possess different characteristics (Dehley and Newton 2005).[8]

Taking account of the previous arguments, the social distance indicator for the next generation, captured by m_{t+1}, is formed by the current generation's experiences from social interactions and the economy's spending on public goods and services. Since social distance is a society-wide characteristic, we shall assume that it is driven by the socialisation efforts of both groups i and j, with each group's impact being weighted by its relative size over the whole population. Hence

$$m_{t+1} = \frac{X}{N}\gamma^i(\varphi_t^{*,i}, G_t) + \frac{N-X}{N}\gamma^j(\varphi_t^{*,j}, G_t), \tag{18}$$

such that $\gamma^x_{\varphi_t^{*,x}}, \gamma^x_{G_t} > 0$ for $x = \{i, j\}$.

For the remainder of our analysis, we are going to employ the following functional forms:

$$\gamma^i(\varphi_t^{*,i}, G_t) = \frac{(1+G_t)(\varphi_t^{*,i}/\overline{\varphi}^i)}{1+G_t(\varphi_t^{*,i}/\overline{\varphi}^i)} \text{ and } \gamma^j(\varphi_t^{*,j}, G_t) = \frac{(1+G_t)(\varphi_t^{*,j}/\overline{\varphi}^j)}{1+G_t(\varphi_t^{*,j}/\overline{\varphi}^j)}, \tag{19}$$

where $\overline{\varphi}^i$ ($\overline{\varphi}^j$) gives the total number of social ties with 'outsiders', initiated by an agent of the current generation of young adults in group i (group j), had social distance been the lowest possible, i.e., $m_t = 1$.[9] Therefore, given (9) and (10), it is $\overline{\varphi}^i = (1-\beta)\tilde{n}$ and $\overline{\varphi}^j = (1-\beta)\underset{\sim}{n}$ respectively. Combining (18) and (19), it is evident that $0 \le m_{t+1} \le 1$, which is the permissible range of values for the social distance variable.

Substituting (9), (10), (14), $\overline{\varphi}^i = (1-\beta)\tilde{n}$ and $\overline{\varphi}^j = (1-\beta)\underset{\sim}{n}$ in (18) and (19), we get a transition equation for the social distance variable. That is

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[8] A good example is the 'Promoting a Culture of Trust' (PACT) grant scheme available to Northern Irish schools by the Integrated Education Fund (IEF) – a charitable trust that was partly established with public funds from the European Union and the Department of Education in Northern Ireland, in addition to private donations. Through this scheme, the IEF supports "projects that promote a culture of trust and the development of paths of reconciliation through…the development of skills, structures and relationships that enable schools, pupils and their parents…to increase their understanding, acceptance and respect for political, cultural and religious differences." (http://www.ief.org.uk/grants/pact/)

[9] Effectively, the presence of $\overline{\varphi}^i$ and $\overline{\varphi}^j$ introduces the maximum number of social ties that a person can initiate with 'outsiders'. Naturally, there is scope for creating new experiences that can narrow the perceived social distance intergenerationally as long as the existing interactions fall short of this number.

$$m_{t+1} = M(k_t, m_t) = \begin{cases} 0 & \text{if} \quad m_t \leq \beta \\ \dfrac{(1+gk_t)[1-(\beta / m_t)]}{1-\beta + gk_t[1-(\beta / m_t)]} & \text{if} \quad m_t > \beta \end{cases}. \tag{20}$$

Given the expression in (20) we can derive the result summarised in

Proposition 1.1. *$M_{k_t} \geq 0$ and $M_{m_t} > 0$, as long as $m_t > \beta$.*

Proof. We can use (20) to establish that, as long as $m_t > \beta$, we have

$$\frac{\partial M(k_t, m_t)}{\partial k_t} = \left(\frac{1}{m_t} - 1\right)\left(1 - \frac{\beta}{m_t}\right)\frac{\beta g}{\{1-\beta + gk_t[1-(\beta / m_t)]\}^2} \geq 0,$$

$$\frac{\partial M(k_t, m_t)}{\partial m_t} = \frac{\beta}{m_t^2}\frac{(1-\beta)(1+gk_t)}{\{1-\beta + gk_t[1-(\beta / m_t)]\}^2} > 0,$$

given that $m_t \leq 1$ holds by assumption.

As we established in the analysis related to the results in (9) and (10), scenarios for which $m_t \leq \beta$ entail some form of social fractionalisation in the sense that individuals will avoid establishing relations and ties with people from different backgrounds, given that social distance is excessively high. Individuals will seek to socialise and interact with people of different characteristics only if social distance is below a certain threshold (i.e., whenever $m_t > \beta$). When this is the case, the extent of social interactions is increasing in m_t. Nevertheless, as we indicated previously, such interactions improve the opinions on the qualities of people from different backgrounds – opinions that are transmitted to the next generation of young agents, thus forming the personality traits that ultimately determine their perceived social distance. In other words, if the current generation is more willing to engage socially, then the processes of vertical and oblique transmission will endow the next generation with perceptions that are conducive to reduced social distance, thus motivating them to establish more social ties with different people, and so on. This is the intuition behind $M_{m_t} > 0$. The intuition behind $M_{k_t} \geq 0$ is also straightforward. When the capital stock is higher, there is an increase in resources that are devoted towards public goods and services. As we have argued before, their provision can cultivate the conditions that reduce the social distance among the next generation's members of the two groups, either because it increases their sense of citizenship and community, or because it has a direct benefit through increased tolerance (e.g., cultivated through the public education system).

1.2.5 The Dynamics of Capital Accumulation

The savings of young workers are deposited to perfectly competitive financial intermediaries who access a technology that transforms units of output at time t into units of capital at time $t+1$ on a one-to-one basis. They rent the capital to firms at a unit price of R_{t+1}.[10] The total amount of deposited savings is Ns_t^*, implying that $K_{t+1} = Ns_t^*$. Given $k_{t+1} = K_{t+1} / N$ denotes capital per worker, we can write the equation that links capital formation to saving according to $k_{t+1} = s_t^*$. Substituting (6) and (16), in this equation we get

$$k_{t+1} = \delta[\theta(1-q+qm_t) + (1-\eta)(H^{\lambda} g^{1-\lambda})^{1-\eta} k_t - T_t]. \tag{21}$$

Recall that the government devotes resources towards productive public spending. We shall assume that it finances public spending by utilising tax revenues according to a continuously balanced budget. This implies that total revenues, NT_t, are equal to total spending, NG_t. Therefore, we can use (14) to write

$$T_t = gk_t. \tag{22}$$

Substituting (22) in (21) yields the transition equation for the stock of capital per worker. That is

$$k_{t+1} = \mathrm{K}(k_t, m_t) = \delta[\theta(1-q+qm_t) + hk_t], \tag{23}$$

[10] Note that capital depreciates completely within one period; therefore the (gross) interest rate on saving is equal to the rental rate of capital.

where $h \equiv g\left[\frac{(1-\eta)H^{\lambda(1-\eta)}}{g^{\eta+\lambda(1-\eta)}}-1\right]$ is a composite term. In order to focus on the more familiar (and more widely analysed) case where capital formation is positively monotonic, we shall employ a parameter restriction in the form of [11]

Assumption 1.1. $H > \left[\frac{g^{\eta+\lambda(1-\eta)}}{1-\eta}\right]^{\frac{1}{\lambda(1-\eta)}} \Leftrightarrow h > 0$.

Furthermore, to guarantee that the long-run equilibrium for the capital stock is bounded, we shall also impose the following condition:

Assumption 1.2. $\delta h < 1$.

We can use (23) to derive the results that identify the effects of the current capital stock and social distance on the process of capital formation. These are summarised in

Proposition 1.2. $\mathrm{K}_{k_t} > 0$ *and* $\mathrm{K}_{m_t} > 0$.

Proof. From (23) it is straightforward to establish that

$$\frac{\partial \mathrm{K}(k_t, m_t)}{\partial k_t} = \delta h > 0,$$

$$\frac{\partial \mathrm{K}(k_t, m_t)}{\partial m_t} = \delta \theta q > 0,$$

thus completing the proof.

Once more the intuition behind these results is straightforward. The explanation behind $\mathrm{K}_{k_t} > 0$ is that (disposable) labour income is higher in an economy with more capital stock. However, labour income determines total

[11] Removing Assumption 1.1 by considering $h < 0$ would imply the presence of cyclical dynamics. This is an issue that goes way beyond the scope of our paper, thus we have chosen to abscond from it.

saving, hence the extent of future capital formation. In addition, by increasing the level of trust and ensuring social cohesion among heterogeneous groups of people, a reduction in social distance improves labour productivity for the reasons that where outlined in the formal description of the economy's production characteristics (see Section 1.2.3). Consequently, the intuition behind $K_{m_t} > 0$ is that the higher productivity increases the wage per unit of labour. Therefore, the reduction of social distance is a factor that promotes saving and capital accumulation.

1.3 The Dynamic Equilibrium

As we have seen from the preceding analysis, the economy's equilibrium is characterised by the system of first-order difference equations with two stock variables k_t and m_t , displayed in (20) and (23). This system of transition equations will facilitate us in tracing the economy's transitional dynamics, as well as deriving its long-run equilibrium, for given initial conditions $m_0 \in (0,1)$ and $k_0 > 0$. However, in order to avoid a situation where the long-run equilibrium is uniquely characterised by a degenerate solution for which $\lim_{t\to\infty} m_t = 0 \ \forall \ m_0 \in (0,1)$ and $k_0 > 0$, we need to impose a condition on the value of the parameter that quantifies the utility accruing from social interactions. This condition comes in the form of

Assumption 1.3. $b > 4 \Leftrightarrow \beta < \frac{1}{2}$.

We shall begin the analysis with the derivation of the steady state solutions. These are summarised in

Lemma 1.1. *There are three pairs of steady state equilibria* (k^*, m^*), (k^{**}, m^{**}) *and* (k^{***}, m^{***}), *such that* $k^{***} > k^{**} > k^*$ *and* $m^{***} > m^{**} > m^*$.

Proof. See Appendix A1.

The formal proof that is provided in Appendix A1 offers explicit solutions for these steady state equilibria. Defining the composite parameter terms $\psi \equiv \delta h$ and $\varepsilon \equiv g\delta\theta$, these solutions are the following:

$$m^{*} = 0, \tag{24}$$

$$m^{**} = -\frac{(1-\psi)(1-\beta)+\varepsilon[1-q(1+\beta)]}{2q\varepsilon} + \frac{\sqrt{\{[(1-\psi)(1-\beta)+\varepsilon[1-q(1+\beta)]\}^{2}+4q\beta\varepsilon[1-\eta+(1-q)\varepsilon]}}{2q\varepsilon}, \tag{25}$$

$$m^{***} = 1, \tag{26}$$

$$k^{*} = \frac{\delta\theta(1-q)}{1-\psi}, \tag{27}$$

$$k^{**} = \frac{\delta\theta(1-q+qm^{**})}{1-\psi}, \tag{28}$$

$$k^{***} = \frac{\delta\theta}{1-\psi}. \tag{29}$$

It should also be noted that Appendix A1 shows $m^{**} \in (\beta, 1)$.

The next step of our analysis is to examine the stability of the three equilibrium pairs. This is something we do in

Lemma 1.2. *The pairs* (k^{*}, m^{*}) *and* (k^{***}, m^{***}) *are locally asymptotically stable whereas the pair* (k^{**}, m^{**}) *is a saddle point.*

Proof. See Appendix A2.

The implication from Lemma 1.2 is that we can establish the economy's long-run equilibrium for given initial conditions $0 < m_0 < 1$ and $k_0 > 0$. This analysis is formally presented in

Proposition 1.3. *The long-run equilibrium of the economy is path-dependent. Particularly, depending on the initial values* (k_0, m_0)*, the economy may converge to either* *the equilibrium characterised by the pair* (k^{*}, m^{*}) *or the equilibrium characterised by the pair* (k^{***}, m^{***}).

Proof. It follows from Lemma 1.2.

In order to get a better understanding of the intuition and the mechanisms leading to the result in Proposition 1.3, we need to recall two issues. Firstly, at the beginning of any time period t there are two predetermined variables – the stock of capital k_t and the social distance indicator m_t – implying that for a given stock of k_t (m_t) there is only one value for m_t (k_t), out of an infinite range of possible ones, that will converge to the saddle point (k^{**}, m^{**}); all the other paths diverge away from it. In essence, the pair (k^{**}, m^{**}) is not a stable equilibrium. Secondly, the fact that individuals engage in social interactions with 'outsiders' only if social distance is sufficiently low (see Eq. 9 and 10) implies that the interior solution $m_{t+1} = m_t$ that one derives (for given k_t) from Eq. (20) acts like a threshold (see Figure 1.1). Given this, higher values of k_t make it more likely that (for given m_t) the dynamics of social distance will eventually converge to $\lim_{t \to \infty} m_t = 1$. This is the reason why the SD locus, illustrating combinations of k_t and m_t for which $\Delta m_t = 0$ in (20), is downward sloping in the phase diagram of Figure 1.2.

The idea that economic development (captured by the stock of capital k_t) makes it less likely that the economy will degenerate to a situation of complete fractionalisation – the latter owing to the excessively large social distance among different groups of people – is important for the long-term prospects of the economy. Particularly, we can anticipate the result that the current stocks of both m_t and k_t will be critical for the equilibrium to which the economy will converge in the long-run.

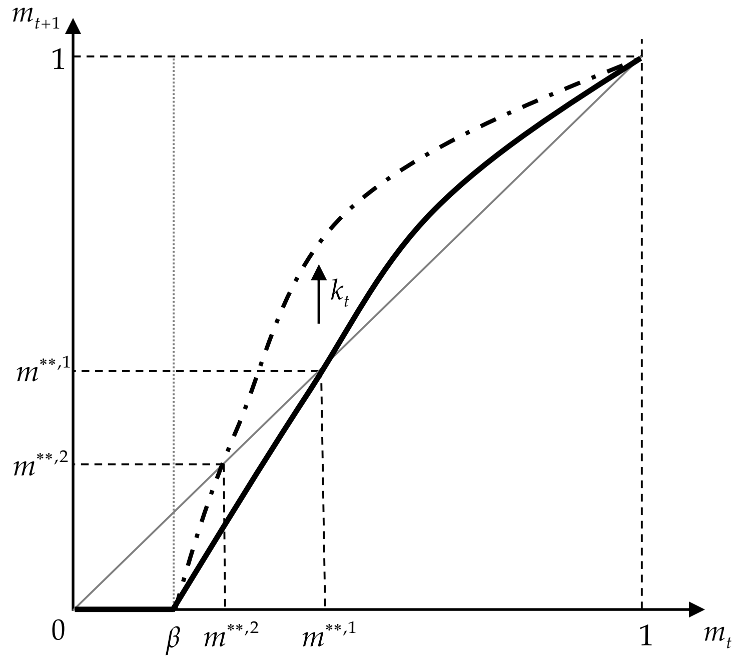

Figure 1. 1. Equilibrium from Eq. (20) for given k_t

Given the above, we can use the phase diagram to identify the forces governing the economy's convergence to the long-run equilibrium. Before doing so, note that the CS locus depicts combinations of k_t and m_t for which $\Delta k_t = 0$ in (23). Let us begin by considering two scenarios entailing the same initial value for m_0 but different initial values for k_0 – a relatively low one (point D) and a relatively high one (point B). At point D the stock of capital, and its effect through public spending, is not sufficient to support a gradual reduction in social distance. Despite the fact that the capital stock may increase temporarily, the corresponding social distance indicator is still below the threshold required to support its gradual decline. On the contrary, as social distance increases, at some point the capital stock will start declining due to the negative effect of greater social distance on productivity, saving, and capital accumulation. Eventually the economy will converge to the equilibrium (k^*, m^*). At point B however, the dynamics are different despite the fact that the initial condition regarding social distance is the same in both scenarios. In this case, the current stock of capital (affecting the dynamics of social distance through the effect of public spending) supports an increasing m_t because, for given k_t, social distance is below (m_t is above) the threshold that is implicitly characterised by the SD locus. Although the capital stock may decrease temporarily, the decrease of social distance will support productivity, saving, and capital accumulation to such an extent that the capital stock will eventually increase and the economy will converge to a long-run equilibrium characterised by (k^{***}, m^{***}).

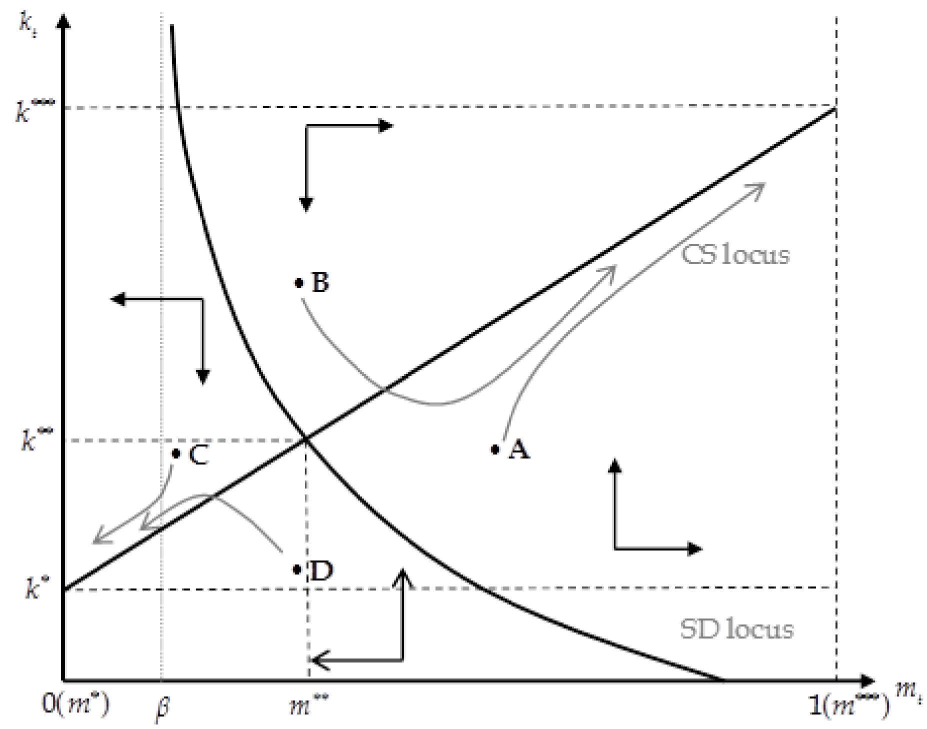

Figure 1. 2. Phase diagram

Now, let us consider two different scenarios entailing the same initial value for k_0 but different initial values for m_0 – a relatively low one (point C) and a relatively high one (point A). At point C, social distance is above (m_t is below) the threshold depicted by the SD locus. Hence it will be increasing over time, having a detrimental effect on capital accumulation due to the loss in productivity, and the economy will eventually converge to the equilibrium characterised by (k^{*}, m^{*}). At point A however, despite the fact that the capital stock is still the same initially, social distance is sufficiently low (i.e., m_t is above the threshold defined implicitly by the SD locus). Therefore, it declines over time, thus supporting capital formation due to the beneficial effect on productivity. Eventually, the economy will converge to (k^{***}, m^{***}).

1.4 An Alternative Specification

In this section we consider two modifications to our set-up, thus bringing it closer to more conventional approaches. Firstly, we shall consider income proportional taxation, i.e., labour income is taxed at a flat rate $\tau \in (0,1)$. In this case, the saving function in (6) is replaced by

$$s_t^* = \delta(1-\tau)w_t . \tag{30}$$

The second modification applies to the production technology for which we replace (11) with

$$Y_t = A_t K_t^{\eta} l_t^{1-\eta} , \tag{31}$$

where now it is assumed that

$$A_t = \Theta(m_t)[H_t^{\lambda} G_t^{1-\lambda}]^{\sigma} , \quad \sigma \in (0,1) . \tag{32}$$

The ideas behind the effect of social distance and of the learning-by-doing externality on productivity remain the same. The variable G_t is once more the value of public goods and services per person, for which it is assumed that they are financed by tax revenues according to a continuously-balanced budget, i.e.,

$$NG_t = N\tau w_t . \tag{33}$$

Furthermore, we assume that $\sigma + \eta < 1$ to guarantee the existence of a bounded long-run equilibrium for the capital stock.[12]

With these assumptions, it is straightforward to establish that the transition equation for capital accumulation, originally in (23), will be replaced by

$$k_{t+1} = \mathrm{K}(k_t, m_t) = \bar{\Lambda}[\Theta(m_t)]^{\frac{1}{1-(1-\lambda)\sigma}} k_t^{\frac{\lambda\sigma+\eta}{1-(1-\lambda)\sigma}} , \tag{34}$$

where $\bar{\Lambda} \equiv \delta(1-\tau)(1-\eta)^{1+(1-\lambda)\sigma}(H^{\lambda}\tau^{1-\lambda})^{\sigma}$. Using (34) we can establish that the results in Proposition 1.2 still hold. As for the dynamics of social distance, originally in (20), these are now described by

[12] If $\sigma = 1-\eta$ the economy will exhibit ever increasing levels of output per worker over time.

$$m_{t+1} = M(k_t, m_t) = \begin{cases} 0 & \text{if} \quad m_t \leq \beta \\ \dfrac{\left(1 + \tilde{\Lambda}[\Theta(m_t)]^{\frac{1}{1-(1-\lambda)\sigma}} k_t^{\frac{\lambda\sigma+\eta}{1-(1-\lambda)\sigma}}\right)[1-(\beta/m_t)]}{1-\beta+\tilde{\Lambda}[\Theta(m_t)]^{\frac{1}{1-(1-\lambda)\sigma}} k_t^{\frac{\lambda\sigma+\eta}{1-(1-\lambda)\sigma}}[1-(\beta/m_t)]} & \text{if} \quad m_t > \beta \end{cases}, \quad (35)$$

where $\tilde{\Lambda} \equiv [\tau(1-\eta)]^{1+(1-\lambda)\sigma} H^{\lambda\sigma}$. Again, it is straightforward to verify that the results of Proposition 1.1 still hold.

Using the system of Eq. (34) and (35), we can also see that the results in Lemma 1.1 remain the same qualitatively. That is, after substituting Eq. (15), there are three equilibrium pairs (k^*, m^*), (k^{**}, m^{**}) and (k^{***}, m^{***}), such that $m^* = 0$, $m^{***} = 1$, $k^* = (\bar{\Lambda})^{[1-(1-\lambda)\sigma]/(1-\sigma-\eta)}(1-q)^{1/(1-\sigma-\eta)}$ and $k^{***} = (\bar{\Lambda})^{[1-(1-\lambda)\sigma]/(1-\sigma-\eta)}$. The issue is that it is impossible to get analytical solutions for m^{**} and k^{**}. Nevertheless, it is clear that the behaviour of the equilibrium pair (k^{**}, m^{**}) is the same as with the one illustrated in Figure 1.1, meaning that once more the SD locus in the phase diagram will be similar to the one in Figure 1.2, acting as a threshold that determines the equilibrium path for given initial conditions. The CS locus will also be monotonically increasing, as in the original phase diagram (Figure 1.2), the only difference now is that it is going to be non-linear. The dynamic implications, as these are summarised in Proposition 1.3, will remain unaffected though.

1.5 Conclusion

The view that the social and economic dimensions of a nation, rather than being independent, are closely interlinked is by no means a new one. Nevertheless, it is receiving increased attention in recent years. With this paper our purpose was to contribute to this emerging literature by adding to the current understanding on the conditions that underpin the relation between social and economic phenomena, and focusing on the joint dynamics of social distance and capital accumulation. This was done by means of a dynamic model where the evolution of social distance and the formation of capital are endogenous and mutually dependent. The characteristics of the model's equilibrium suggest that current imbalances among nations can cast their shadow over their long-term socio-economic prospects. In other words, the positive feedback in the co-evolution of social distance and economic activity may perpetuate these imbalances and establish them as permanent fixtures. In this respect, both the current conditions that govern social distance and the current stage of economic development may be vital in perpetuating these differences. Economies at a similar stage of economic development, but different in terms of perceived social distance, may experience strikingly different long-term prospects. Equally important, however, the likelihood that countries which are similar in terms of perceived social distance may yet experience drastically opposite socio-economic paths if they differ in terms of their economic conditions.

Methodologically, our approach was to analyse these issues in the most tractable manner so as to enhance the clarity of the mechanisms involved and to avoid blurring their intuition. One of the means to achieve this was the careful selection of functional forms to allow the derivation of closed-form solutions. Furthermore, in order to maintain a sharp focus on the joint dynamics of social distance and capital accumulation, without undermining our story by making its intuition impenetrable, we absconded from other issues that could provide a broader perspective in terms of both social capital and economic performance. For example, in addition to social distance and trust, other components of social capital that can be transmitted through successive generations of individuals are social norms. Their importance in relation to economic growth has already been identified by researchers (e.g., Cole *et al.* 1992) but without considering a mechanism for intergenerational transmission of such norms. Furthermore, besides the dynamics of income per capita, social distance could impinge on other characteristics of the economy such as income inequality or demographics (e.g., fertility behaviour). Finally, social distance could interact with other engines of long-run growth such as education/human capital and R&D/technological progress. All these issues certainly merit attention and offer a large scope for future research on the co-evolution of economic and social characteristics.

Chapter 2

Trust and Economic Performance: A Panel study

2.1 Introduction

In general, trust can be defined as a person's belief in the integrity, reliability, and ability of others. "Others" refers to either different (groups of) people or, more broadly, the various institutional aspects of the society in which a person lives (e.g., leaders and the quality of governance; law and order, etc.).

With respect to economics, trust can be seen as facilitating various aspects of economic activity. In particular, researchers have argued that trust can reduce transaction costs, promote cooperation, and encourage business activities (Knack and Keefer 1997). Therefore, economists claim that a higher level of social trust is positively correlated with economic development (Moegan and Hunt 1994). Put differently, it has been widely accepted and demonstrated that social trust benefits the economy and that a low level of trust inhibits economic growth.

Historically, sociologists and economists have examined various forms of trust, each one associated with specific behavioural characteristics. Broadly speaking, some of the various forms of trust include generalised trust, particularised trust, strategic trust and moralistic trust (Uslaner 2003). Generalised trust facilitates interactions with people who are different from ourselves and is thus strikingly different from particularised trust in which people only have faith in cooperating with individuals or groups possessing similar characteristics, such as ethnicity religion, or social class. Whereas generalised trust is founded solidly upon the belief that individuals/groups from different backgrounds can indeed pursue common and mutually advantageous goals, particularised trust often occurs within a clan as each group attends to their own interests and rarely places any faith in the good intentions of others. For example, Evangelical Christians in the

United States have very high in-group trust since they volunteer and donate to charities within their own faith communities. Nevertheless, it has been suggested that they rarely display a similar degree of trust towards other groups (Wuthnow 1999; Uslaner 2001). Moralistic trust refers to circumstances in which people place their faith in those who they believe share their common moral code. Strategic trust describes situations in which different parties understand (either through information or their own experience) that cooperation can lead to mutually advantageous outcomes (Uslaner 2003).

The earliest related literature analyses social capital, including trust, and the impacts of social capital on government performance across regions in Italy (Banfield 1958; Coleman 1988; Gambetta 1988; Putnam *et al*. 1993). Since those studies, the importance of trust to economic performance has drawn substantial attention. Therefore, the impact of trust on economic outcomes has been empirically investigated across different countries by Knack and Keefer (1997) and La Porta *et al*. (1997). The evidence also suggests that trust can promote financial development, effectively facilitate economic outcomes such as entrepreneurship and influence economic exchanges between two countries (Guiso *et al*. 2004, 2006, and 2009). Moreover, Bloom *et al*. (2007), Algan and Cahuc (2009) and Aghion *et al*. (2010) examine the correlation between trust and institutions.

Furthermore, the theoretical foundations of the effect of trust on the economy have been provided by Zak and Knack (2001). They present a model in which the rate of investment is determined by the level of trust. In their model, trust is characterised as the time that agents allocate to production rather than verifying others' trustworthiness. Thus, this model effectively illustrates how different levels of trust determine economic performance. It also demonstrates the existence of a low-trust poverty trap. According to the model, trust depends on the institutional, economic and social environment. Specifically, trust is positively correlated with the institutional environment and economic conditions but negatively correlated with population heterogeneity.

The problem in this area is determining how trust should be measured.

Existing research papers tend to employ measures of trust that are produced through surveys/questionnaires. Since the 1980s, surveys covering a large number of countries such as the General Social Survey (GSS) and the World Value Survey (WVS) have become available. The "standard" survey questions addressing trust are as follows: "Do you think most people would try to take advantage of you if they got a chance, or would they try to be fair?" from the GSS or "Generally speaking, would you say that most people can be trusted or that you can't be too careful in dealing with people?" from the WVS. Measurements of trust are conducted by assessing the average responses as "try to be fair" and "can be trusted" to the corresponding survey questions. The survey results are either used as the alternative measurement of trust or as the indicators of moral values (Tabellini 2010; Guiso *et al*., 2011).

However, the surveys can be interpreted differently due to the polysemy of the questions and responses (Algan and Cahuc 2013). Moreover, the respondents who claim to have high trust in others may behave differently in the reality (Algan and Cahuc 2013). In addition, there is always the risk that survey data contain systematic measurement errors, which can be either self-reported errors that are constant for each respondent over time or answers from a small group of people with particular personality traits that may not be informative about their corresponding behaviour (Zak 2005). Finally, the lack of WVS data on trust for less developed countries hinders the investigation into trust in these countries and often makes inter-temporal comparisons and cross-country studies infeasible.

To improve the measurement of trust, some researchers have conducted laboratory experiments that usually apply the "trust game" raised by Berg *et al*. (1995) or its variants.

Earlier studies demonstrate that the correlation between the answers to the trust survey and the behaviours in the experiment are mixed. For example, Glaeser *et al*. (2000) reveal that the answers to the trust survey are inconsistent with the behaviour in experiments. However, Holm and Danielson (2005) suggest that the answers to the trust survey and the behaviour in experiments are positively correlated in some countries, such as Sweden. Fehr *et al*. (2002) compare the results from the representative survey and representative behavioural data from a social dilemma experiment in Germany to illustrate that the trust question can measure the behaviour of trust but not trustworthiness. Meanwhile, Ermisch *et al*. (2009) show that the trust survey cannot predict behaviour in the trust experiment by conducting a real monetary rewards experiment on a sample of the British population.

Perez *et al*. (2006) suggest exploring the trust proxy in two directions: either by obtaining the data from one of the surveys or by proxying the variables that indicate the degree of trust, particularly in reference to a financial or commercial relationship. Since the self-reported trust levels from the surveys and the actual behaviour in trust experiments are ambiguous, this chapter follows the second approach to construct a new trust index by considering social and institutional characteristics as well as the educational and socioeconomic conditions that have been shown to affect trust levels.

This analysis is a systematic attempt to construct an alternative measure of trust. It also contributes to the literature by using a panel study to illustrate the effect of trust on economic performance variables. The three main objectives are to construct a new trust index by applying a factor analysis (FA) technique, to compare the new trust index to the previous measures of trust (trust survey), and to investigate the correlation between trust and foreign direct investment (FDI) inflows as well as income inequality.

The remainder of this chapter is organised as follows. Section 2.2 illustrates the components of the trust index, the FA technique, and how FA can be used to construct the trust index. Section 2.3 compares the trust index to the trust survey measurement. Section 2.4 describes the application of the trust index by examining the correlation between the trust index and economic performance variables, such as FDI inflows and income inequality. Section 2.5 concludes this chapter by discussing its main findings and limitations.

2.2 Trust index

This section explains the process of generating the trust index. The first subsection illustrates the components used to build the trust index. The theoretical foundations and empirical evidence for each component are discussed. In the second subsection, an FA technique is introduced and applied to assign weightings to all the components. Lastly, the third subsection presents the trust index built by the FA technique for 136 countries and reveals its validity.

2.2.1 Components of trust index

Many authors emphasise the determining role of social or political institutions and social relationships on trust (Arrow 1972; Putnam *et al*. 1993; Knack 2002; Uslaner 2002). Additionally, Glaeser *et al*. (2002) propose an economic approach to trust and demonstrate the correlation between trust and economic growth. I consider both economic and non-economic indicators in terms of degree of trust to generate a proxy. Therefore, my trust index would include three aspects: institutional environment; population heterogeneity; and educational and socioeconomic conditions, which are also consistent with the theoretical work of Zak and Knack (2001).

Most of the components I use to generate the trust index are drawn from the International Country Risk Guide (ICRG) dataset. The ICRG generates data concerning the ratings of political, economic and financial risks by using approximately 30 metrics based on original indicators. As a result, the generated data have different score points describing the scenarios for each country in each year. Here, I mainly employ the political rating data.

2.2.1.1 Institutional environment

For the institutional environment, I employ the *index of property rights* introduced by Knack and Keefer (1995). The *index of property rights* is produced by equally weighing four indicators from the ICRG: *quality of bureaucracy*, *law and order*, *corruption* and *investment profile*. *Quality of bureaucracy* mainly captures the degree of strength of institutions and the quality of their bureaucracy using scores that range from 0 to 4. For the countries with higher scores, government change would not cause a dramatic policy revision or interruption in government service. However, if a country lacks a cushioning effect when facing a change in the government, that country would receive lower ratings. *Law and order* assesses two parts: the "law" element and the "order" element. The "law" part reflects the strength and impartiality of the legal system, and the "order" part reviews the willingness of citizens to implement and comply with laws. *Law and order* scores range from 0 to 6. If a country suffers from a very high crime rate or a country's laws are always ignored without effective sanction, it would be given a low rating. Higher scores are allocated to countries with a greater respect for their judicial system. *Corruption* measures the corruption rating of a country's political system. Specifically, corruption is assessed in terms of "excessive patronage, nepotism, job reservations, 'favour-for-favours', secret party funding, and suspiciously close ties between politics and business". Higher ratings are given to countries in which special payments make no difference to the government officials, while the lower ratings are given to the countries with serious corruption problems. *Investment profile* examines the possible risks to investments that are not caused by other political, economic or financial risk components. This indicator mainly consists of "contract viability/expropriation", "profits repatriation" and "payment delays". *Investment profile* is scored from 0 to 12 with higher scores implying a lower risk to investment. The scores of the index of property rights range from 0 to 28. Higher scores indicate a country's governmental institutions are more effective, guaranteeing property rights and contract enforcement.

Knack and Keefer (1997) suggest that trust can be created by formal institutions such as a strong rule of law. Essentially, citizens tend to rely on informal and local rules in a weak legal enforcement environment, which nourishes particularised trust within a close social circle while simultaneously weakening generalised trust. The Mafia in Sicily vividly demonstrates the evolution of particularised trust under weak legal enforcement. Gambetta (1993) states that legal enforcement was very weak in Sicily around 1812 since the abolition of feudalism took place much later there than in the rest of Europe. As the state was unable to protect private property rights there, the Mafia took advantage by providing informal local protection. This local protection through patronage clearly treats those under the protection differently from everyone else. Without legal institutions and civic-minded officials, generalised trust can be damaged (Rothstein 2011). In the same vein, Guiso *et al*. (2008) note that weak legal enforcement in the distant past in some regions of Italy is still associated with a lower level of trust today.

The empirical work of Rothstein and Uslaner (2005) also shows the positive correlation between trust and the institutional environment. This correlation is robust when using different measurements of institution quality than those commonly applied in the literature, such as government effectiveness, accountability and corruption, as well as the effectiveness of property rights protection, rule of law and contract enforcement.

Moreover, Tabellini (2008) uses a novel way to verify the casual effect of institutional quality on trust. Specifically, he documents the correlation between the trust level of US immigrants and the institutional environment of their country of origin.

Recently, Algan and Cahuc (2013) illustrate the strong correlation between trust and institutional system by empirically investigating a sample of 100 countries. They also find a similar positive correlation between trust and governance quality in 163 European regions.

2.2.1.2 Population heterogeneity

In terms of population heterogeneity, I use measures of *ethnic tensions*, *religious tensions* and *internal conflict* from the ICRG. The scores of both *ethnic tensions* and *religious tensions* range from 0 to 6 with a low rating reflecting high tensions. *Ethnic tensions* may stem from a diverse racial, national or linguistic composition within a country. Higher scores are allocated to the countries with minimal tensions even if these types of differences exist among the people, while lower scores are allocated to countries with one intolerant group that is unwilling to compromise with the opposing group. In such countries, racial and national tensions are very high, preventing reconciliation. These tensions may even result in a civil war. *Religious tensions* might be caused by a single religious group's desire to express its own identity, dominate governance or even separate from the country. Countries with a single religious group that desires to dominate the government or even suppress religious freedom would eventually have a substantial social distance between that group and citizens with different religions. *Internal conflict* assesses the "political violence" in the country, which involves three subcomponents: "civil war/coup threat, terrorism/political violence and civil disorder". Countries with higher ratings would have no armed or civil unrest against the government. These countries would also have governments that prevent "arbitrary violence, direct or indirect, against its own people". Otherwise, the country would receive lower scores.

Ritzen and Woolcock (2000), Woolcock *et al*. (2006) and Baliamoune-Lutz (2009) emphasise that the essential element of trust is social cohesion. Social cohesion is defined by Ritzen and Woolcock (2000) as "a state of affairs in which a group of people have an aptitude for collaboration that produces a climate for change". This definition suggests that ethnic tensions can be a proxy for social cohesion because social cohesion not only reflects the popular observance of policy reforms but also affects the institutional implementation of those reforms. Additionally, ethnic fractionalisation might lead to the social exclusion of specific ethnic groups or even evoke a civil war (Woolcock *et al*. 2006; Baliamoune-Lutz 2009). In the same vein, Putnam (2007) reveals that trust tends to decline where ethnic fractionalisation or segregation exist. He illustrates that trust is relatively low in ethnically diverse residential areas based on cross-cities studies. By investigating across US states, Alesina and La Ferrara (2000, 2002) provide similar evidence. The findings may be because people naturally prefer to trust others with similar backgrounds and are therefore inclined to place less trust in those who are different from them. Moreover, high ethnic tensions result in lower cooperation, as represented by collective actions such as funding and public goods (Alesina *et al*. 1999; Miguel and Gugerty 2005). This decline in cooperation might be primarily due to weakened collective action resulting from distinct preferences and the free rider problem within ethnically diverse areas.

The influence of religious tensions on trust is similar to the influence of ethnic tensions. Levi (1996) and Uslaner (2002) reveal that some groups may inhibit instead of improving generalised trust in people who are outside the group. Groups that reinforce the in-group identity, such as religious fundamentalists and racists, can undermine generalised trust. Stolle (2000) suggests that if the group members have strong within-group trust, then those group members tend to have less trust in outsiders over time.

Jacob and Tyrell (2010) note that the inhabitants of regions undergoing civil war tend to have a relatively low probability of fulfilling their civic duties, resulting in problems such as low voter turnout, low rate of participation in voluntary associations and low rate of voluntary organ donation. Moreover, Rohner *et al*. (2013) propose a theory regarding how war and civic conflicts are associated with distrust. They claim that a history of conflicts impacts the trust (beliefs) of the agent. The agent then redefines their trust (beliefs) and passes it to the next generation. Therefore, conflicts such as civil wars and civil disorder could even result in the permanent collapse of trust. Additionally, the empirical research of Rohner *et al*. (2013) illustrates that the measure of average trust is negatively associated with the frequency of civil war after controlling for democracy and other covariates based on country-level statistics during the period 1981-2008. Similarly, by exploring the violence surrounding the 2007 Kenyan election in Africa, Dercon and Gutierrez-Romero (2010) indicate that violence undermines generalised trust. In the same pattern, Rohner *et al*. (2013) uncover the causal effects of internal conflicts on trust by using individual- and country-level data in Uganda during the period 2002-2004. These scholars provide the robust results of intense fighting, which damages generalised trust by using a variety of identification methods.

2.2.1.3 Education and socioeconomic conditions

I adopt *socioeconomic conditions* from the ICRG and *secondary school enrolment* from the World Bank as proxies. *Socioeconomic conditions* measures factors including "unemployment rate, consumer confidence and poverty", which reflect the socioeconomic pressures at work and in society. The points range from 0 to 12. High ratings are given to countries in which the citizens live under good socioeconomic conditions. *Secondary school enrolment (% of gross)* measures the percent of students enrolled at the secondary school level regardless of age.

Hausman (1979) and Womeldorff (1991) note that education is positively related to trust because an individual who disutility the future is more likely to violate promises when they trade with others and presumably assume that promises made to them would also be violated. Indeed, Helliwell and Putnam (2007) argue that education can facilitate social trust. If individuals believe that people with higher education levels are trustworthy, then those individuals tend to trust others with higher education levels and might return to their trusting behaviour. Therefore, a higher average education level could promote a climate of trust. Presumably, people are more likely to trust others in the society with higher average education level.

Earlier studies have revealed that individuals in high socioeconomic conditions tend to have higher levels of generalised trust than those in low socioeconomic conditions (Brehm and Rahn 1997; Putnam 2000; Alesina and La Ferrara 2002; Subramanian *et al.* 2003; Kaasa and Parts 2008). Furthermore, Rothstein and Uslaner (2005) note that poverty, which is also captured by socioeconomic condition, could damage the social fabric since the poor would feel isolated and disrespected by others.

To construct an index of country-level trust, set of weights must be selected for each component. Rather than imposing arbitrary or equal weights, I apply an FA technique to let the data determine the weights directly. The statistical summary of each component can be seen in Appendix B.1.

2.2.2 Factor analysis technique

2.2.2.1 Factor analysis

FA is a statistical methodology that aims to use a smaller number of latent variables to represent a larger number of observed variables (Lewis-Beck 1994). For example, after using FA, the variation within five observed variables can be represented by one or two unobserved variables (latent factors). FA can also be used to predict latent variables by investigating the joint variation within the observed variables. Using this technique, each observed variable can be modelled as a linear combination of the latent factors with the term "error". Since the observed variables are interrelated, the set of variables can finally be reduced to a lower number of unobserved factors. FA was first used in psychometrics field, and it was later widely used in the social sciences, marketing and other applied economics research areas.

FA is similar to principal component analysis (PCA). However, these two techniques are not exactly identical. PCA is a data description technique, while FA can be used to verify hypotheses concerning the correlation between the original data. Moreover, according to the concepts of PCA and FA, although both will eventually maximise the total variance, they capture different types of variance. Specifically, the components in PCA have orthogonal linear combinations, and they maximise the total variance. However, the factors in FA are linearly combined to maximise the shared fraction of the variance, namely, the latent construction. Thus, FA is suitable for testing a theoretical model of latent factors related to observed variables. With respect to simply reducing the number of current variables, PCA is more appropriate.

2.2.2.2 Statistical model

Suppose that in a dataset, we have a group of n observable random variables such as $\mathrm{x}_1, x_2, \ldots, x_n$ with means $\mu_1, \mu_2, \ldots\ \mu_n$. According to the above definition of FA, after using this technique, we get some α_{ij} associated with k unobserved variables F_j. The mathematical equation can be expressed as follows:

$$x_i - \mu_i = \alpha_{i1}F_1 + \cdots + \alpha_{ik}F_k + \varepsilon_i \tag{1}$$

Here, $i \in 1, \ldots, n, j \in 1, \ldots, k$, and $k < n$. The error term is ε_i, which is independently distributed with a zero mean and finite variance. Here, Fs can be referred to as factors or latent unobserved variables. In addition, xs are observed variables. The equation simply conveys that we can use fewer factors to express the association among a higher number of observed variables by using FA techniques.

In particular, we have a common factor model or one factor model. In this case, it would be

$$\begin{aligned} x_1 - \mu_1 &= \alpha_{11}F + \varepsilon_1 \\ x_2 - \mu_2 &= \alpha_{21}F + \varepsilon_2 \\ &\cdots \\ x_n - \mu_n &= \alpha_{n1}F + \varepsilon_n \end{aligned} \tag{2}$$

where xs are the observed variables, F is the common factor, αs are associated factor loadings and εs are error terms or uniqueness.

2.2.2.3 Types

There are generally two types of FA: exploratory FA and confirmatory FA. The exploratory FA technique helps researchers to identify the complicated interrelationship among variables and factors. Confirmatory FA is used to test the hypothesis of the association between observed variables and unobserved variables. The most significant difference between these two techniques is whether a hypothesis concerning the association of the variables is introduced. Additionally, unlike exploratory FA, confirmatory FA is mainly used to predict latent factors and the associated structures in the original dataset.

2.2.2.4 Terminology

FA uses several specific terms. The first is *factor loadings*, which captures the correlation coefficients between the corresponding observed variables and latent factors. Additionally, the squared factor loading reveals the percentage of the variance that can be explained by the factor. The sum of the squared factor loadings for all factors for a given variable is called *communality*. *Communality* measures the percentage of variance of a given variable that is explained jointly by all the latent factors, which can be an indicator of whether the model is suitable. The variance that cannot be accounted for by the latent factor is *uniqueness*, which equals one minus *communality*. Additionally, the number of factors are decided by the *eigenvalue*. *Eigenvalue* describes the variance explained by the latent factor, which indicates the explanatory power of the latent factor based on the variables. Thus, a higher eigenvalue indicates a more powerful latent factor. Specifically, the latent factor and its structure can express the set of observed variables more accurately. The last related term is *factor scores*. *Factor scores* refers to the scores of each set of variables on each factor. By using FA techniques, each observation eventually receives its respective scores. In addition, by multiplying the score by the associated observation, the latent variable value of this observation can be obtained.

2.2.2.5 Criteria for determining the number of factors

There are several criteria for determining the number of factors, the most notable of which are the Kaiser criterion, the variance explained criterion, scree plot, Horn's parallel analysis and Velicer's MAP test. The Kaiser criterion is the one that is most commonly used and is the default for most statistical software, such as Stata and SPSS. According to the Kaiser criterion, all the factors with eigenvalues below 1 will be dropped.

2.2.3 Construction of the Trust index using FA

I assume that one common factor can be used to explain the variance of trust. Each component is predicted to positively contribute to the "trust index". Thus, I apply the confirmatory common factor model.

First, I illustrate the correlation matrix of the components, and the results are shown in Table 2.1. Second, the FA is applied and the eigenvalues for each possible factor and the corresponding factor loadings are collected. The FA output can be found in Table 2.2.a. According to the Kaiser criteria, the number of retained factors should be one, which is consistent with the assumption of the common factor model. To further verify the number of factors, the scree plot is illustrated and shown in Figure 2.1, which also suggests the common factor model.

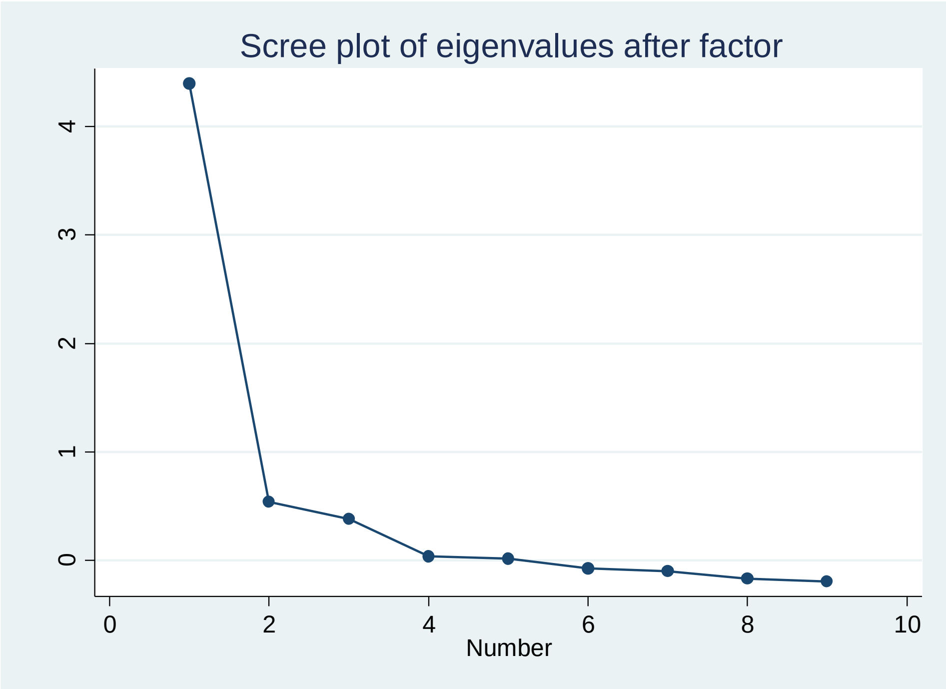

Figure 2. 1. Scree plot of eigenvalues after factor analysis

The factor loadings and the unique variances between each component and the factors are shown in Table 2.2.b. Since the retained number of factors is one, only Factor 1 would be applied. The first column in Table 2.2.b illustrates how the common factor (Factor 1) captures each component. Specifically, the common factor "trust index" is positively correlated to each observed component. Moreover, the high factor loadings suggest the stronger contribution of latent factors to the observed components. I follow the majority of studies and use 0.3 as the limit (Comrey and Lee 1992; Hair *et al.* 1998). In my case, all the factor loadings are above 0.3, which means that the latent "trust index" effectively captures all the characteristics of the observed components. Finally, the factor scores for each component with a standardised unit are predicted using the regression scores method[13]. The scores are shown in Table 2.3, and all the components positively contribute to the trust index, which is consistent with the previous assumption. Among the components, *law and order* has the highest factor score, which indicates that a standardised unit increase in the *law and order* component is associated with a 0.25 standardised unit increase in the latent "trust index".

[13] The maximum likelihood (ML) method is only one of several methods used for confirmatory factor analysis (CFA). When one or more of the components is categorical, the regression scores method is more appropriate.

Table 2. 1. Correlation matrix of the components

`	Bureaucracy quality	Law and order	Corruption	Investment profile	Ethnic tensions	Religious tensions	Internal conflict	Socioeconomic conditions	School enrolment
Bureaucracy quality	1.0000								
Law and order	0.6804	1.0000							
Corruption	0.6739	0.6289	1.0000						
Investment profile	0.4814	0.4337	0.1961	1.0000					
Ethnic tensions	0.3528	0.5212	0.3668	0.2446	1.0000				
Religious tensions	0.2930	0.3831	0.3654	0.2077	0.3959	1.0000			
Internal conflict	0.5311	0.7499	0.4490	0.4581	0.6042	0.4520	1.0000		
Socioeconomic conditions	0.6295	0.5812	0.4829	0.5820	0.3058	0.2323	0.4670	1.0000	
School enrolment	0.6553	0.6218	0.4674	0.4876	0.4335	0.3184	0.5386	0.5212	1.0000

Table 2. 2. a. Factor analysis

Factor	Eigenvalue	Difference	Proportion	Cumulative
Factor 1	4.3966	3.8591	0.9112	0.9112
Factor 2	0.5375	0.1572	0.1114	1.0226
Factor 3	0.3803	0.3445	0.0788	1.1014
Factor 4	0.0358	0.0205	0.0074	1.1088
Factor 5	0.0153	0.0896	0.0032	1.1120
Factor 6	-0.0743	0.0274	-0.0154	1.0966
Factor 7	-0.1016	0.0686	-0.0211	1.0755
Factor 8	-0.1702	0.0240	-0.0353	1.0402
Factor 9	-0.1942	-	-0.0402	1.0000

Table 2. 2. b. Factor loadings (pattern matrix) and unique variances

Variable	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Uniqueness
Bureaucracy quality	0.8078	-0.2271	-0.2066	0.0238	-0.0264	0.2519
Law and order	0.8605	0.0990	-0.0439	-0.1190	-0.0234	0.2331
Corruption	0.6841	0.0468	-0.4110	0.0081	0.0338	0.3597
Investment profile	0.5751	-0.3135	0.3284	0.0197	0.0233	0.4623
Ethnic tensions	0.5813	0.3468	0.1123	0.0385	-0.0094	0.5276
Religious tensions	0.4639	0.2777	0.0165	0.0938	0.0549	0.6956
Internal conflict	0.7845	0.2647	0.2055	-0.0574	0.0025	0.2690
Socioeconomic conditions	0.7015	-0.3144	0.0456	-0.0210	0.0574	0.4032
School enrolment	0.7377	-0.0963	0.0418	0.0815	-0.0775	0.4321

Table 2. 3. Scoring coefficients (method= regression)

Variable	Factor 1
Bureaucracy quality	0.2124
Law and order	0.2453
Corruption	0.1111
Investment profile	0.0892
Ethnic tensions	0.0823
Religious tensions	0.0590
Internal conflict	0.1944
Socioeconomic conditions	0.1240
School enrolment	0.1268

The acceptability of the common FA model has been confirmed based on three aspects. First, the overall goodness of fit is examined. The p-value of chi2 is close to zero, which indicates that the common FA model is meaningful. Second, the interpretability, strength, and statistical significance of the estimated parameters have been reviewed. In my case, the parameters are of a magnitude and direction consistent with expectations and the existing empirical evidence. Finally, the measures of sampling adequacy are checked by the Kaiser-Meyer-Olkin (KMO) test. Table 2.4 explains the KMO test results. Generally, the overall KMO test score must be above 0.5. The KMO value here is 0.867, which is considered a good indication of the usefulness and the adequate quality of the components and the FA model.

Finally, I obtain the trust index for 136 countries from 1984 to 2008. A high value on the trust index indicates a higher trust level. I also explore the average trust level rankings for the 136 countries over the period 1984-2008. Finland has the highest trust level, and the Republic of the Congo lies at the opposite end of the ranking. Generally, northern European countries rank in the top quarter, while African, Middle Eastern and South American countries tend to have low trust among their populations. The full ranking of the average trust index for the 136 countries are shown in Appendix B.2.

Table 2. 4. Kaiser-Meyer-Olkin measure of sampling adequacy

Variable	KMO
Bureaucracy quality	0.8667
Law and order	0.8771
Corruption	0.8206
Investment profile	0.8022
Ethnic tensions	0.8891
Religious tensions	0.8967
Internal conflict	0.8427
Socioeconomic conditions	0.8910
School enrolment	0.9234
Overall	0.8670

2.3 Comparison with trust survey results

As mentioned, generalised trust data are usually obtained from the WVS. The WVS is a worldwide longitudinal dataset managed by the University of Michigan. It has provided questionnaires about people's values and beliefs since 1981 (Abramson and Inglehart 1995). The measure of trust from the trust survey is generated with respect to the percentage of respondents who answer "Most people can be trusted" to the survey question "Generally speaking, , would you say that most people can be trusted or that you need to be very careful when dealing with people?" Currently, the WVS provides data for 5 waves: wave I over the period 1981-1984, wave II over the period 1990-1994, wave III over the period 1995-1998, wave IV over the period 1999-2004 and wave V over the period 2005-2008. Initially, I took all the observations from wave I to wave V as the trust survey sample. In total, the trust survey sample contains 100 countries. Since the trust survey data are not continuous and most of the countries only joined one or two waves out of five, it is impossible to generate a trust value for each country in every wave. To illustrate the variation of trust values among 100 countries, I take the average over five waves to represent the trust level for each country. In the sample, Norway is the country with the highest level of trust at more than 66% of the population trusting others. By contrast, Trinidad and Tobago ranks the lowest with only 3.8% of the population trusting others. The full ranking list of trust levels measured by the WVS trust question can be seen in Appendix B.2.

To compare the ranking of my trust index and the trust survey, I find 85 common countries from the above two samples and reorganise the rankings for these countries. Appendix B.3 illustrates the comparisons of the rankings for these countries in terms of the two measures of trust identified above. I should emphasise that the rationale behind this comparison is informational purposes rather than making statements about how well my index corresponds to the "correct" ordering of a country's trust level. I find some countries that illustrate very distinct rankings in the two indices (trust survey ranking and trust index ranking) and show them in Table 2.5. In the trust survey ranking, countries such as Luxembourg, France, Portugal, Slovenia, Cyprus and Malaysia surprisingly rank around and below the average level of trust, while relatively high trust levels have been found in China, Saudi Arabia, Vietnam, Indonesia, Iraq and India. In particular, Luxembourg ranks 40, placing it behind Vietnam (9) and India (22) in the trust survey ranking. However, in the trust index ranking, Luxembourg ranks 3, which is just behind Finland (1) and the Netherlands (2). Similarly, France ranks at 53, which is below the average trust level in the trust survey ranking; by contrast, it ranks 19 in the trust index, which places it in the top quarter. By contrast, China ranks 5 in the trust survey ranking, but it is just above the average trust level at 41 in the trust index ranking. Following the same pattern, Vietnam ranks 9 in the trust survey and 58 in the trust index ranking.

I further investigate the similarity between the trust index and the measurement of the trust survey. Initially, the scatter plot (Figure 2.2) between the measurement of the trust survey and trust index suggests an obvious positive correlation. This highly positive correlation has also been confirmed by Table 2.6. The value 3.456 reveals that the measurements of the trust survey are positively related to the trust index and are highly statistically significant. One additional standardised unit increase in the measure of the trust survey leads to an increase of 0.52 standardised units in the trust index.

Even though there are several differences between the measurements of the trust survey and the trust index in terms of ranking. The highly positive correlation between these two suggests that the trust index can then be used to calculate the trust level when the trust value is not available in the WVS.

Table 2. 5. Subsample of the Trust Index ranking and Trust Survey ranking

Country	Trust Index ranking	Survey ranking	Difference
Luxembourg	3	40	37
France	19	53	34
Portugal	20	67	47
Slovenia	24	63	39
Cyprus	29	77	48
Saudi Arabia	39	6	33
Malaysia	40	78	38
China	41	5	36
Brazil	49	84	35
Vietnam	58	9	49
Iran	60	24	36
Egypt	65	33	32
India	66	22	44
Indonesia	77	11	66
Ethiopia	81	46	35
Pakistan	82	34	48
Bangladesh	83	51	32
Nigeria	84	52	32
Iraq	85	13	72

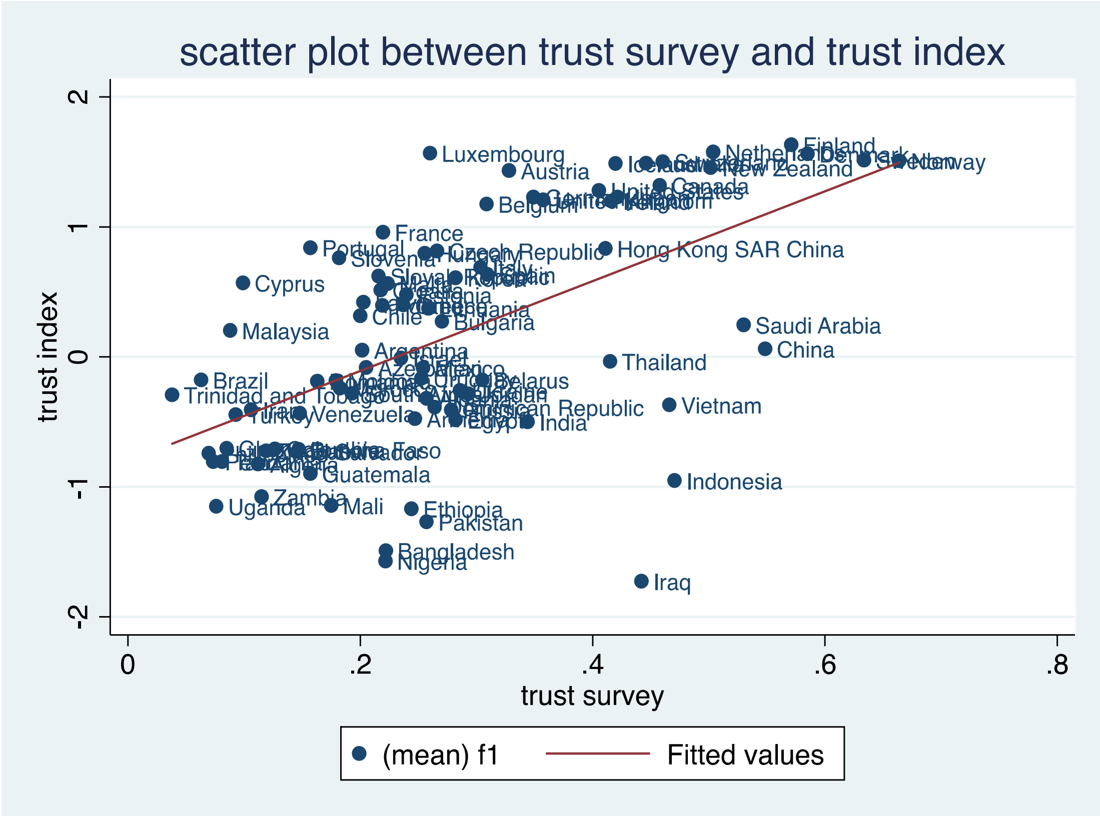

Figure 2. 2. Scatter plot between measure of trust survey and trust index

Table 2. 6. Pooled regression between trust survey and trust index

	Trust index
Trust survey	3.456***
	(0.556)
Constant	-0.799***
	(0.171)
Sample Size	85
R-square	0.3178

* p<0.10, ** p<0.05, *** p<0.01
Note: Trust index and trust survey are measured over the period 1984-2008.

2.4 The correlation between the trust index and economic performance

Earlier studies mainly explore the cross-sectional effect of trust measured by the trust survey variable obtained from the WVS regarding economic activity variables such as GDP per capita and investment rate. Knack and Keefer (1997) suggest that the average trust level is strongly associated with GDP per capita across countries. Putnam *et al*. (1993) also document the cross-region effect of trust on economic development in Italy. Cross-country studies on the effect of trust have also been conducted by La Porta *et al.* (1997), Whiteley (2000), Zak and Knack (2001), Beugelsdijk *et al. (*2004), Bjørnskov (2006b), Knowles (2006), Berggren *et al. (*2008), Neira *et al.* (2009), Tabellini (2010), and Dincer and Uslaner (2010). There are fewer studies of panel data analysis on the correlation between trust and economic performance[14], which could be due to the severe issue of missing observations of the trust data from the WVS and the estimation results based on that data tending to be not robust in the panel fixed effect model (Hall and Ahmad 2013). Therefore, I explore the effect of trust (measured by the trust index) on FDI and income inequality using a panel data analysis.

2.4.1 Trust and foreign direct investment (FDI)

Trust has been routinely considered to be an essential element for most economic transactions (Blau 1964). The impact of trust on economic growth has been widely investigated (such as Putnam *et al.* 1993; Knack and Keefer 1997; Woolcock 1998; Knowles 2006; Tabellini 2010; Algan and Cahuc 2013). While FDI is one of the most significant contributors to economic growth (Borensztein *et al*. 1998), the influence of trust on FDI has rarely been examined[15].

Trust could promote FDI mainly through two channels. First, a high level of trust effectively cultivates a cooperative business environment, which facilitates FDI activities. Trust has been seen as the "expectation of regular, honest cooperative behaviour" (Bhardwaj *et al*. 2007), which could lessen the probability of opportunism and strengthen the transparency of economic exchange (Bradach and Eccles 1989; Hill 1990). Earlier studies suggest that people are more likely to trust others in a society with a high trust level, which results in a cooperative relationship that facilitates economic achievement (Miller 1992; Mcknight *et al.* 1998; Das and Teng 2000). From the multinational enterprises' perspective, a

[14] There is limited research using panel data analysis on the effect of trust on economic growth; see, for example, Perez *et al.* (2006), Baliamoune-Lutz (2011) and Hall and Ahmand (2013).

[15] Few studies have explored the role of trust on FDI. Those that have include the recent work of Bhardwaj *et al.* (2007) and Zhao and Kim (2011). They adopt the trust survey from the WVS as the measurement of trust.

cooperative business environment in the host country is helpful to making FDI (Zhao and Kim 2011) profitable. Second, trust can enhance contract enforcement (Fukuyama 1995; Knack and Keefer 1997), which is mainly due to trust promoting compliance with property rights and business rules and norms (Adler and Kwon 2002). Furthermore, trust could reduce transaction costs by mitigating conflicts and monitoring costs (Fukuyama 1995; Meyerson *et al*. 1996). In addition, positive FDI performances can signal a high trust level in the society and attract even more foreign investors.

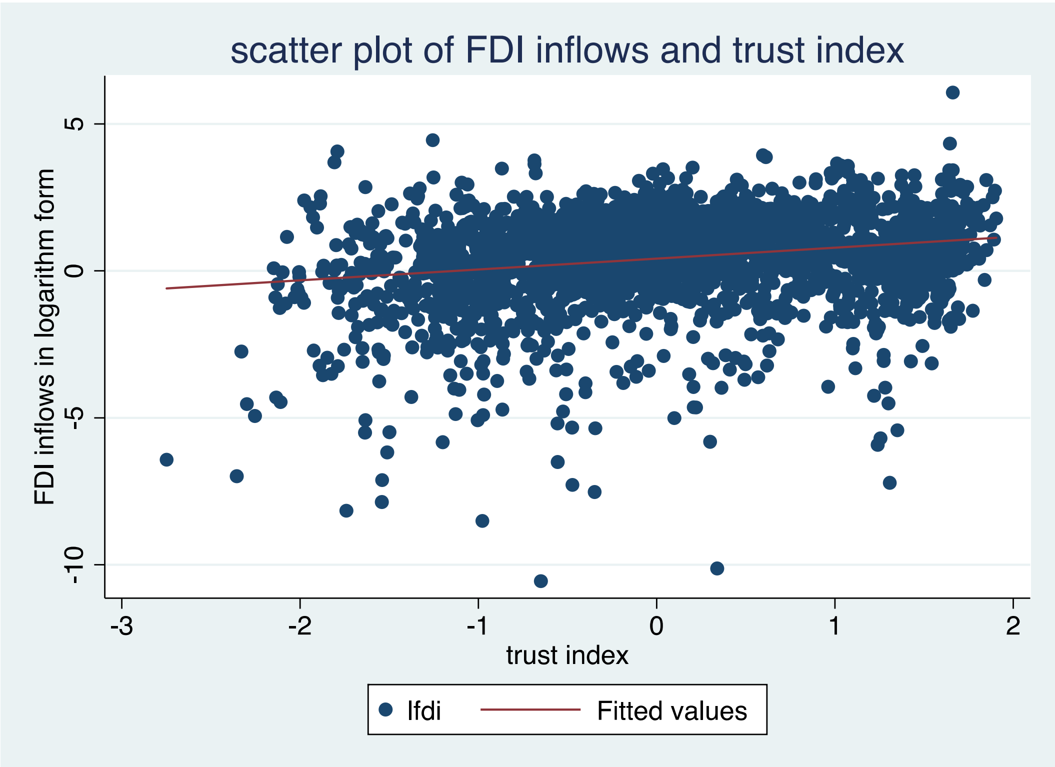

Figure 2. 3. Scatter plot for FDI inflows (% GDP) in logarithm form and trust index

To investigate the effect of trust level on FDI inflows, I first build the trust index by using the method in section 2.2.3 for the period from 1984 to 2014. The upward line in Figure 2.3 illustrates the positive correlation between the trust index and FDI inflows (ln (FDI/GDP)) for 139 countries over the period 1984-2014. This correlation implies that a high level of trust in host country is more attractive for foreign investors. Additionally, the casual relationship between trust and FDI inflows is empirically tested by the following model:

$$\ln((\frac{FDI}{GDP})_{i,t}) = \beta_0 + \beta_1 T_{i,t-1} + \beta_2 X_{i,t} + \mathrm{a}_i + u_{it} \qquad (3)$$

where FDI is the FDI net inflows, and T represents trust level. In this model, the first lag of the trust index is applied. X captures a vector of control variables such as school enrolment, trade rate and growth rate. Item a_i captures the unobserved effects. The idiosyncratic error term is u_{it}, and it should be uncorrelated with each explanatory variable across all time periods, namely, $\mathrm{E}(u_{it}|X_i, a_i) = 0$. Also u_{it} are homoscedastic and serially uncorrelated with $\mathrm{Var}(u_{it}|X_i, a_i) = Var(u_{it}) = \sigma_u^2$ and $\mathrm{Cov}\ (u_{it}, u_{is}|X_i, a_i) = 0$, for all t=1, …, T and t $\neq$ s. The FDI data and all the controls are collected from the World Bank's *World Development Indicators.*

Table 2.7 presents the estimation results between FDI and trust by applying the pooled OLS regression method. In model (1), the trust index is positively associated with FDI at 1% significant level. The coefficient of the trust index becomes insignificant but remains positive after controlling for education, trade rate and other determinants of FDI in model (2).

Table 2. 7. Pooled OLS regression between trust and FDI inflows

	(1)	(2)
Trust index (t-1)	0.371***	0.063
	(0.033)	(0.048)
Education		0.006***
		(0.001)
Trade rate		0.012***
		(0.001)
Annual growth rate		0.047***
		(0.007)
Constant	0.449***	-1.137***
	(0.030)	(0.118)
Sample Size	2463	2127
No. of Countries	133	131
R-square	0.050	0.218

* p<0.10, ** p<0.05, *** p<0.01

Notes: All variables are measured over the period 1984-2014. The dependent variable is FDI inflows measured as FDI net inflows (% of GDP). The trust index is the one built using FA. Education is measured as secondary school enrolment (% gross); the trade rate is measured as trade (% of GDP); and the annual growth rate is measured as GDP growth (annual %).

Regarding the endogeneity problem, possible issues for the panel data analysis could include potential reverse causality and heterogeneity due to unobserved characteristics. This model is less likely to have any reverse causality issues for two reasons. First, I apply the lagged trust index to the regression model. Additionally, the previous literature suggests no causality from FDI to trust (Zhao and Kim 2011). Since the potential heteroscedasticity could result in a biased estimation in the pooled OLS model, I also employ the fixed effects and random effects models. The estimation results are shown in Table 2.8; both random and fixed effects reveal that economies with high trust levels result in positive FDI inflows.

Table 2. 8. Fixed effects and random effects model between trust and FDI inflow

	(1)	(2)	(3)	(4)
Trust index(t-1)	0.665***	0.369***		
	(0.070)	(0.063)		
Trust index(t-2)			0.556***	
			(0.069)	
Trust index(t-3)				0.510***
				(0.068)
Education	0.020***	0.011***	0.021***	0.020***
	(0.002)	(0.002)	(0.002)	(0.002)
Trade rate	0.023***	0.017***	0.021***	0.021***
	(0.002)	(0.001)	(0.002)	(0.002)
Annual growth rate	0.044***	0.045***	0.042***	0.040***
	(0.006)	(0.006)	(0.006)	(0.006)
Constant	-2.977***	-1.759***	-2.989***	-2.761***
	(0.188)	(0.173)	(0.194)	(0.201)
Methodology	fe	re	fe	fe
Sample Size	2127	2127	2002	1898
No. of Countries	131	131	128	128
R-square	0.251	0.269	0.256	0.257

* p<0.10, ** p<0.05, *** p<0.01

Notes: All variables are measured over the period 1984-2014. The dependent variable is FDI inflows measured as FDI net inflows (% of GDP). The trust index is the one built using FA. Education is measured as secondary school enrolment (% gross); the trade rate is measured as trade (% of GDP); and the annual growth rate is measured as GDP growth (annual %). The unobserved effect a_i is assumed to be uncorrelated with each control variable in all periods under the random regression model.

According to the Hausman test (see Appendix B.5), the fixed effects model is more efficient. Based on the estimation results of fixed effects model (1), a one standard deviation increase in the trust index (t-1) would lead to a 63.8% increase in the rate of FDI inflows (%GDP). Model (1) in Table 2.8 also reveals that education level, trade rate and growth rate positively contribute to FDI inflows, which is consistent with the previous literature. In models (3) and (4), I further explore how historical trust levels influence current FDI inflows by using a fixed effects model. Both models uncover the important role played by the historical trust level.

Since there is a difference between OECD countries and non-OECD countries in terms of the level of development, I then examine the influence of trust index on FDI for these two groups of countries. Table 2.9 illustrates the estimation results between FDI and different historical levels of the trust index by applying a fixed effects model. As shown in Table 2.9, the coefficients of trust are all positive and significant for OECD and non-OECD countries. Therefore, trust is an important determinant of FDI for both OECD and non-OECD countries.

Table 2. 9. Fixed effects estimations between trust and FDI inflow for OECD and non-OECD countries

	(1)	(2)	(3)	(4)	(5)	(6)
Trust index (t-1)	0.569***			0.680***		
	(0.138)			(0.084)		
Trust index (t-2)		0.574***			0.540***	
		(0.135)			(0.082)	
Trust index (t-3)			0.627***			0.463***
			(0.132)			(0.082)
Education	0.015***	0.014***	0.013***	0.022***	0.025***	0.023***
	(0.004)	(0.004)	(0.004)	(0.003)	(0.003)	(0.003)
Trade rate	0.023***	0.023***	0.021***	0.022***	0.020***	0.020***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Annual growth rate	0.019*	0.024**	0.023*	0.051***	0.047***	0.045***
	(0.011)	(0.011)	(0.012)	(0.007)	(0.007)	(0.007)
Constant	-3.338***	-3.207***	-2.976***	-2.568***	-2.653***	-2.506***
	(0.364)	(0.377)	(0.393)	(0.223)	(0.231)	(0.242)
Classification	OECD	OECD	OECD	non-OECD	non-OECD	non-OECD
Sample Size	741	710	680	1386	1292	1218
No. of Countries	34	34	34	97	94	94
R-square	0.442	0.479	0.477	0.226	0.232	0.229

* p<0.10, ** p<0.05, *** p<0.01

Notes: All variables are measured over the period 1984-2014. The dependent variable is FDI inflows measured as FDI net inflows (% of GDP). The trust index is the one built using FA. Education is measured as secondary school enrolment (% gross); the trade rate is measured as trade (% of GDP); and the annual growth rate is measured as GDP growth (annual %).

2.4.2 Trust and income inequality

The correlation between income inequality and trust has received considerable attention. A high level of trust has been linked to low income inequality. Individuals with high levels of trust tend to have a stronger sense of fairness and care more about others in society (Ram 2013). Therefore, citizens in a society with a high trust level are more willing to accept redistribution, which would mitigate income inequality (Algan and Cahuc 2013). By contrast, income inequality could be detrimental to the strength of social trust. Since inequality might make people feel unfairly treated and exploited, social trust would decline as inequality increases.

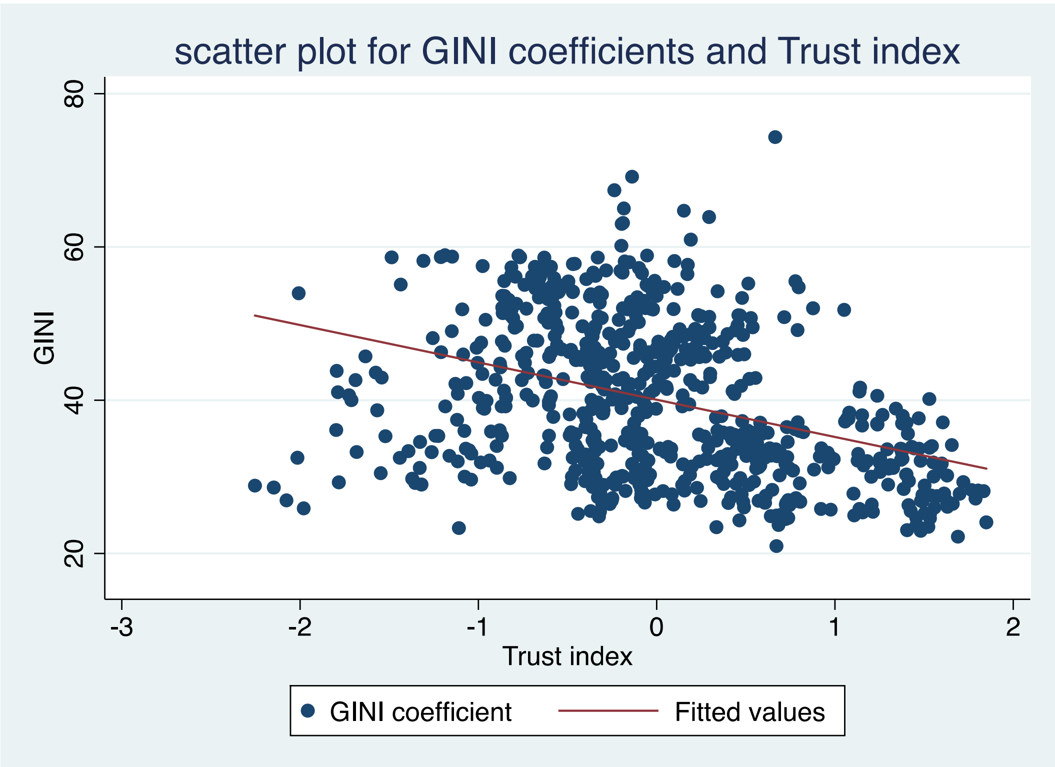

Figure 2. 4. Scatter plot for Gini coefficient and trust index

As shown in Figure 2.4, income inequality (the Gini coefficient) and the trust index (built in section 2.4.1) are negatively correlated for 104 countries over the period from 1984 to 2014. High trust countries are associated with low income inequality (a lower Gini coefficient). However, countries with a low level of trust are generally related to high income inequality (a higher Gini coefficient). The effect of income inequality on generalised trust has been empirically studied by Rothstein and Uslaner (2005) and Jordahl (2007). However, the influence of generalised trust on income inequality is seldom investigated[16].

To examine the influence of trust on the Gini coefficient, I employ the following econometric model:

$$\ln\left(GINI_{i,t}\right) = \beta_0 + \beta_1 T_{i,t-1} + \beta_2 X_{i,t} + a_i + \vartheta_{i,t} \quad (4)$$

where $GINI_{i,t}$ represents the Gini coefficient for country i at time t. A high value for the Gini coefficient corresponds to a high level of income inequality in the country. Again, T refers to trust and is the same index developed in section 2.4.1. X captures a panel of explanatory variables including education level, income level, trade rate, inflation rate and government cost. The unobserved item is a_i i. The idiosyncratic error term is ϑ_{it} and should be uncorrelated with each explanatory variable across all time periods, namely, $\mathrm{E}(\vartheta_{it}|X_i, a_i) = 0$. Also ϑ_{it} is homoscedastic and serially uncorrelated with $\mathrm{Var}(\vartheta_{it}|X_i, a_i) = Var(\vartheta_{it}) = \sigma_\vartheta^2$ and $\mathrm{Cov}\ (\vartheta_{it}, \vartheta_{is}|X_i, a_i) = 0$ for all t=1, …, T and t $\neq$ s. The Gini coefficient and all the control variable data are collected from the World Bank's *World Development Indicators.*

At first, I ignore all the endogeneity problems and adopt the pooled OLS regression method. Models (1) and (2) in Table 2.10 show the robust negative correlation between the trust index and the Gini coefficient. The Gini coefficient would decrease approximately 13.1% from a one standard deviation increase in one period lag of the trust index. By controlling other determinants of income inequality, the effect of the trust level decreases; a one standard deviation increase in the historical trust level leads to a 10% decrease in income inequality.

To eliminate unobserved heterogeneity, I also apply the fixed effects and random effects estimation models. The estimated coefficients of the trust index

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16 Algan and Cahuc (2013) illustrate the only cross-country study addressing how trust influences income inequality by employing the pooled OLS regression model.

(Table 2.11) from these two models are all positive yet statistically insignificant, which could be due to the large amount of missing data regarding the Gini coefficient or the potential causal effect that income inequality should have on trust. Earlier studies show that income inequality can undermine generalised trust (Rothstein and Uslaner 2005; Jordahl 2007). Two methods are used to further explore the exact correlation between trust and income inequality. The first applies the between regression model to investigate cross-sectional information between income inequality and its determinants at a particular trust level. The other method uses the index of the historical trust level in the regression model to eliminate the reverse correlation between trust and income inequality.

Table 2. 10. Pooled OLS regression between Gini and trust

	(1)	(2)
Trust index (t-1)	-0.137***	-0.105**
	(0.026)	(0.045)
Education		-0.002*
		(0.001)
Income		0.053
		(0.042)
Trade rate		-0.001
		(0.001)
Inflation rate		-0.0001
		(0.000)
Government cost		-0.010*
		(0.005)
Constant	3.665***	3.574***
	(0.026)	(0.345)
Sample Size	696	553
No. of Countries	103	95
R-square	0.187	0.292

* p<0.10, ** p<0.05, *** p<0.01

Notes: All variables are measured over the period 1984-2014. The dependent variable is GINI coefficients. The trust index is the one built using FA. Education measured as secondary school enrolment (% gross). Income is measured as the logarithm form of GDP per capita. The trade rate is measured as trade (% of GDP). The inflation rate is measured as the GDP deflator (annual %). Government cost is measured as the general government's final consumption expenditure (% of GDP).

To eliminate unobserved heterogeneity, I also apply the fixed effects and random effects estimation models. The estimated coefficients of the trust index

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Table 2. 11. Fixed effects, random effects and between regression of Gini and trust

	(1)	(2)	(3)
Trust index (t-1)	0.022	0.004	-0.123**
	(0.021)	(0.021)	(0.061)
Education	0.0003	8.27e-06	-0.003*
	(0.001)	(0.001)	(0.002)
Income	-0.048	-0.057	0.062
	(0.049)	(0.036)	(0.053)
Trade rate	0.0002	0.0001	-0.0003
	(0.0004)	(0.0004)	(0.001)
Inflation rate	-0.00004	-0.00004	-0.0002
	(0.0001)	(0.0002)	(0.001)
Government cost	0.001	0.0001	0.003
	(0.003)	(0.003)	(0.006)
Constant	4.032***	4.151***	3.268***
	(0.430)	(0.294)	(0.445)
Methodology	fe	re	be
Sample Size	553	553	553
No. of Countries	95	95	95
R-square	0.04	0.143	0.251

* p<0.10, ** p<0.05, *** p<0.01

Notes: All variables are measured over the period 1984-2014. The dependent variable is GINI coefficients. The trust index is the one built using FA. Education measured as secondary school enrolment (% gross). Income is measured as the logarithm form of GDP per capita. The trade rate is measured as trade (% of GDP). The inflation rate is measured as the GDP deflator (annual %). Government cost measured as the general government's final consumption expenditure (% of GDP). The unobserved effect a_i is assumed to be uncorrelated with each control variable in all periods under the random regression model.

The between regression estimator in Table 2.11 (model 3) shows that trust index (t-1) negatively contributes to income inequality with statistical significance at the 5% level. In particular, a one standard deviation increase in the trust index is associated with an average 11.8% decrease in the Gini coefficient across countries. This coefficient is smaller than the one from the OLS regression since this estimator is based on the regression of the mean values of the trust index of each country. These results, as well as the ones from OLS regression model, show the robust negative correlation between income inequality and trust level across countries. Compare the estimators from model (1) and (2) with (3) in Table 2.11; the positive coefficients of trust level in models (1) and (2) are presumably due to the lack of Gini coefficient data from each country. This can be verified by the fact that the available data for the Gini coefficient are only 938 observations among 139 countries with 31-year periods (see Appendix B.4).

To further explore the causality between trust and income inequality, I then employ the historical level of the trust index in the regression model even though the estimated coefficients of the historical trust index are still statistically insignificant. The estimated coefficient of second and third time lag of the trust index reveal a negative correlation between historical trust level and income inequality from the random effects model (models 5 and 6 from Table 2.12). The between regression estimations again confirm the negative relation between trust level and income inequality across countries by employing the earlier trust level in Table 2.12.

Considering the difference in terms of the original country characteristics and the availability of the Gini coefficient data, I again classified the whole dataset into two groups of OECD and non-OECD countries and investigated how trust influences the Gini coefficient for these two groups. Regarding the availability of Gini coefficient data, we have 252 and 686 separate observations for OECD and non-OECD countries, respectively. In other words, the Gini coefficient data for each OECD country are larger on average than each non-OECD country. The scatter plot between Gini coefficients and the trust index for OECD and non-OECD country groups are shown in Appendix B.6. At first glance, this depicts an obvious negative relation between the Gini coefficient and the trust index for the OECD group but a vague correlation for non-OECD countries. An econometric approach will be used to explain the correlation between trust and income inequality for OECD and non-OECD groups.

Table 2. 12. Correlation between historical Gini and trust

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Trust index (t-1)	0.022 (0.021)			0.004 (0.021)			-0.123** (0.061)		
Trust index (t-2)		0.006 (0.017)			-0.005 (0.016)			-0.129** (0.055)	
Trust index (t-3)			0.003 (0.015)			-0.005 (0.015)			-0.085* (0.048)
education	0.0003 (0.001)	0.001 (0.001)	0.001 (0.001)	8.27e-06 (0.001)	0.0002 (0.001)	0.0004 (0.001)	-0.003* (0.002)	-0.003** (0.002)	-0.001 (0.002)
income	-0.048 (0.049)	-0.055 (0.049)	-0.047 (0.047)	-0.057 (0.036)	-0.060* (0.034)	-0.060* (0.032)	0.062 (0.053)	0.074 (0.049)	0.016 (0.048)
Trade rate	0.0002 (0.000)	0.0001 (0.000)	1.53e-06 (0.000)	0.0001 (0.000)	0.0001 (0.000)	-0.0001 (0.000)	-0.0003 (0.001)	-0.001 (0.001)	-0.0005 (0.001)
Inflation rate	-0.00004 (0.000)	-0.0002*** (0.000)	-0.0002*** (0.000)	-0.00004 (0.000)	-0.0002*** (0.000)	-0.0003*** (0.000)	-0.0002 (0.001)	-0.0003 (0.001)	-0.003* (0.001)
Government cost	0.001 (0.003)	-0.001 (0.003)	0.001 (0.003)	0.0001 (0.003)	-0.001 (0.003)	-0.001 (0.003)	0.003 (0.006)	0.005 (0.006)	-0.004 (0.006)
Constant	4.032*** (0.430)	4.120*** (0.431)	4.028*** (0.419)	4.151*** (0.294)	4.187*** (0.286)	4.170*** (0.267)	3.268*** (0.445)	3.178*** (0.408)	3.714*** (0.381)
Method	fe	fe	fe	re	re	re	be	be	be
N	553	541	511	553	541	511	553	541	511
No. of countries	95	96	93	95	96	93	95	96	93
R-square	0.040	0.075	0.103	0.143	0.142	0.158	0.251	0.290	0.240

* p<0.10, ** p<0.05, *** p<0.01

Notes: All variables are measured over the period 1984-2014. The dependent variable is Gini coefficients. The trust index is the one built using FA. Education measured as secondary school enrolment (% gross). Income is measured as the logarithm form of GDP per capita. The trade rate is measured as trade (% of GDP). The inflation rate is measured as the GDP deflator (annual %). Government cost measured as the general government's final consumption expenditure (% of GDP). The unobserved effect a_i is assumed to be uncorrelated with each control variable in all periods under the random regression model.

Based on the estimation results in Table 2.11, I applied the Hausman test for the fixed effects regression model and random effects regression model. According to the Hausman test (see Appendix B.7), the random effects regression model is more appropriate. Thus, the random effects model is applied for OECD and non-OECD groups, and the results are illustrated in Table 2.13. For the OECD countries, the different historical levels of the trust index are significantly negative when correlated with income inequality according to models (1)-(3) in Table 2.13. However, there is no significant effect of trust on income inequality among non-OECD countries. These results suggest that trust can effectively mitigate the income inequality issue among the OECD group. Apparently, the initial trust level is relatively high among the OECD countries, and the income inequality issue can improve as the trust level becomes stronger. However, the income inequality problem cannot be alleviated in non-OECD countries, as the improvement of trust level could be due to idiosyncratic conditions among the non-OECD countries.

Table 2. 13. Random effect of Gini and trust for OECD and non-OECD countries

	(1)	(2)	(3)	(4)	(5)	(6)
Trust index (t-1)	-0.065***			0.024		
	(0.022)			(0.024)		
Trust index (t-2)		-0.040*			0.003	
		(0.022)			(0.018)	
Trust index (t-3)			-0.040*			0.002
			(0.023)			(0.016)
Education	0.001	0.001	0.001	-0.001	-0.0004	-0.0002
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Income	0.012	0.009	0.027	-0.024	-0.029	-0.031
	(0.052)	(0.053)	(0.051)	(0.048)	(0.045)	(0.043)
Trade rate	-0.001**	-0.001**	-0.001**	0.0001	0.0001	-0.0001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Inflation rate	-0.0003	-0.0004	-0.001	-7.47e-06	-0.0002***	-0.0002***
	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)
Government cost	-0.019***	-0.019***	-0.019***	0.007**	0.006*	0.006*
	(0.004)	(0.004)	(0.004)	(0.003)	(0.003)	(0.004)
Constant	3.767***	3.791***	3.593***	3.860***	3.898***	3.908***
	(0.521)	(0.526)	(0.497)	(0.390)	(0.371)	(0.350)
Classification	OECD	OECD	OECD	non-OECD	non-OECD	non-OECD
Sample Size	196	192	186	357	349	325
No. of countries	30	30	30	65	66	63
R-square	0.667	0.651	0.620	0.071	0.078	0.027

* p<0.10, ** p<0.05, *** p<0.01

Notes: All variables are measured over the period 1984-2014. The dependent variable is Gini coefficients. The trust index is the one built using FA. Education measured as secondary school enrolment (% gross). Income is measured as the logarithm form of GDP per capita. The trade rate is measured as trade (% of GDP). The inflation rate is measured as the GDP deflator (annual %). Government cost measured as the general government's final consumption expenditure (% of GDP). The unobserved effect a_i is assumed to be uncorrelated with each control variable in all periods under the random regression model.

2.5 Conclusion

The primary goal of this chapter is to explore a new measure of trust. My motivation is to determine whether there is a simpler and less demanding alternative trust index for the purpose of ranking countries and exploring the effects of trust on economic performance. The current measures of trust are mainly produced by trust survey questionnaires and experimental results from trust games. However, because of the aforementioned limitations arising from ambiguous trust results obtained from trust surveys and experiments, an inter-temporal and cross-country analysis on trust becomes extremely difficult.

The trust index is constructed using the FA technique in order to assign weights to all the various characteristics that are generally considered to be determinants of generalised trust, which include the following: (i) the level of corruption and bureaucratic quality, (ii) law and order, (iii) investment profile, (iv) religious and/or ethnic tensions, (v) socioeconomic conditions, (vi) internal conflict, and (vii) secondary school enrolment. Compared to the trust survey measure, the ranking of countries in the trust index is more consistent with people's perception.

This chapter also contributes to the literature by adding the panel data study of the effects of trust on both FDI and income inequality. As a result, trust is revealed to play a significantly positive role in FDI for both OECD and non-OECD countries by employing the fixed effects model. With regard to income inequality, the random regression models show that trust is more pronounced among the OECD countries.

Generally, this chapter draws on the apparent inconsistencies between self-reported trust levels and actual behaviour in trust games and constructs an alternative index composed of characteristics that have been shown to determine trust levels. Of course, this is a first attempt in this direction. As a result, further empirical testing may be required to settle the unavoidable debate over the most appropriate and relevant components of this index. By no means do I believe that the results from trust surveys should be disregarded. However, given the inconsistencies between self-reported and actual behaviour, as well as the significant differences in the rankings reproduced from the survey results and the index of components that affect generalised trust, further research on the (perhaps) most appropriate measures of trust to be used in empirical analysis is certainly still needed.

Chapter 3

Social Interactions and Labour Market Outcomes

3.1 Introduction

Social interaction has been viewed as an important information resource in the job searching process. According to the 2004 Spring Report of the UK Labour Force Survey, approximately 30% of individuals who start their jobs over the previous three months learned about the job from social acquaintances who used to work for the employer. A number of early studies emphasise the important information transmission function of social interaction for job seekers (Montgomery 1991; Granovetter 1995; Ioannides and Loury 2004).

Social interactions might influence an individual's labour market outcomes through various mechanisms.

First, an individual's cognitions about the value of spending time in a job or out of a job are impacted by his or her surrounding social networks. Earlier theoretical studies suggest that the better the employment status of an individual's connections, the better his or her employment prospects (Calvo-Armengol 2004; Calvo-Armengol and Jackson 2004; Bramoulle and Saint-Paul 2010). Cappellari and Tatsiramos (2015) also empirically illustrate that a high employment rate in a person's social network would lead to a higher probability of that individual entering the job market. However, some researchers such as Cox (1997) and Portes (1998) note that some types of social interactions might induce negatively affect the labour market supply. Specifically, some individuals may be surrounded by social networks in which the social norm is being out of the job market. The individual could join non-work ethnic organisations. In addition, an intergenerational welfare system may demotivate some individuals to actively join the labour market, as is occurring in the United States (Murray 1994).

Second, from the labour demand perspective, employers always treat a potential employee endowed with rich social networks more favourably. This preference is mainly because those rich social networks would enhance one's productivity in the workplace, which will benefit the firm. Holzer (1988) claims that referrals from employees have always been used as a cheap screening and signalling device for the employer and that employers believe they can get more information from referrals than direct applications. Rees (1966) defends the notion that only competent staff would be recommended to the employer from the existing employee since the existing employee does not want to affect his or her own reputation with the employer. The empirical evidence of employers focusing more on potential employees with higher social capital has been found in some European countries (Barbieri *et al*. 1999).

Finally, job information through social interactions can qualify the job searching process by relaying information about job opportunities to potential job seekers and conveying information about an employee's productivity and the quality of the work-job match. The job searching process is complicated by the asymmetric information between employees and employers. With the coordination of social interaction, the job searching process could be more efficient and effective (Stone *et al.* 2003). Similarly, Burt (1992) suggests that social ties could effectively encourage the mobility of individuals and the sharing of knowledge. Using a theoretical model, Calvo-Armengol and Zenou (2005) illustrate that social networks indeed impact an individual's economic success. In their paper, they emphasise that social networks can help to spread job information within one's social groups and can be a useful complementary method to formal job searches.

Essentially, social interactions can effectively reduce the job search cost and promote coordination between potential employees and employers, which can eventually prompt a suitable job match. Nevertheless, the empirical studies of the influence of social interactions on labour market outcomes are very rare.

Aguilera (2002) explores the correlation between social interactions expressed by friendship ties and labour force participation represented as employment and hours worked based on the 2000 Social Capital Benchmark Survey. He suggests that social interaction is generally positively associated with increased job market participation. Stone *et al.* (2003) investigate how the social interactions with family, friends and civic ties affect an individual's labour market outcomes in a survey sample of 1500 Australians. Cappellari and Tatsiramos (2015) examine the social network effect on job finding rates and job match quality based on the British Household Panel Survey (BHPS) by using the employment of friendship ties as the social network proxy.

The above literature stresses how social interactions with strong ties (such as within families and close friends) facilitate the individual's labour market outcomes. However, an earlier study of Granovetter (1973), who raises the hypothesis of "the strength of weak ties", suggests that the "cohesive power of weak ties" plays a significant role in facilitating information diffusion, social mobility and community organisations. Kavanaugh *et.al* (2007) also demonstrate that weak ties among people across groups lead to higher levels of collective efficacy. Furthermore, it has been argued that having weak ties can effectively accelerate knowledge sharing within an organisation. (Constant *et al*. 1996; Hansen 1999; Levin and Cross 2003) In terms of the labour market, Montgomery (1992) uses a theory model to claim that weak ties can be more effective in labour market outcomes since job information offered from weak ties is more frequent than information offered by strong ties, meaning that weak ties have better job information distribution.

In this chapter, I focus on the influence Specifically, the social interaction index is proxied by active group membership, which counts the sum number of groups in which individuals currently are active based on their responses to a series of survey questions about a range of groups from the British Household Panel Survey (BHPS). In previous studies, researchers use the level of civic engagement and group membership as measures of social interactions (Narayan and Pritchett

1999; Glaeser *et al*. 2002; Stone *et al.* 2003). However, they did not consider the intensity of each individual's participation in the organisation.

Substantial evidence (Healy and Cote 2001) reveals that social capital can be easily achieved in the process of joining and interacting in organisations. These organisations could be sports groups, environmental groups or religious groups. These groups can help to mitigate the social distance between members; furthermore, trust, loyalty, altruism and cooperation can gradually emerge within them. Information will also flow within the groups, which could benefit the members.

The main goal of this chapter is to examine the effect of social interactions on individuals' employment status. I also investigate how this social interaction effect can be heterogeneous for different gender groups and at different ages. Moreover, I build three social interaction indices (each reflecting active group membership in certain type of groups) to explore how the social interactions embedded in different set of groups have different effects on labour market outcomes. Furthermore, I extend my study by measuring the effect of social interactions on wages. In addition, I capture the difference in this effect for different gender groups as well as different types of occupations.

The remainder of this chapter is organised as follows. Sections 3.2 and 3.3 describe the data and identification strategies, respectively. Section 3.4 covers the main results of the influences of social interactions on individuals' labour market outcomes. Section 3.5 presents the three social interaction indices and how these indices relate to an individual's employment status. The influence of social interaction on wages is addressed in section 3.6. Section 3.7 offers the conclusion, which summarises the main findings and limitations.

3.2 Data and descriptive statistics

3.2.1 Data

To examine how social interactions and labour market outcomes are related, I exploit longitudinal data from the British Household Panel Survey (BHPS). The BHPS is an annual panel survey covering various aspects of an individual's life including measures that broadly constitute social interactions and labour market outcomes. The BHPS is conducted by the Institute for Social and Economic Research and comprises a cross-section of approximately 10,000 British households drawn from 250 areas of Great Britain beginning in 1991.

The social interaction index (active group membership) is gathered from the BHPS questionnaire section named "social and interest group activity". Survey participants are asked to report information about whether they are active in a list of groups. The groups in this survey are as follows: political parties, trade unions, environmental groups, parents' associations, tenants'/residents' groups, religious groups, voluntary service groups, pensioner organisations, Scout/Guides organisations, other community groups, other social groups, sport clubs, women's institutes, professional organisations, and any other groups. The social interaction index is the sum of the number of groups in which an individual is active and ranges from 0 to 9.

Furthermore, I construct three other social interaction indices to capture the different sets of the aforementioned groups in which individuals are active, and I then explore how these three indices affect an individual's job market outcomes. Methodologically, principal component analysis (PCA) is applied to produce the three indices based on the correlation of the distribution of each active group membership throughout the sample.

Since the BHPS is a longitudinal dataset, the impact of social interaction on job market outcomes can be measured over an individual's lifetime. The BHPS provides information in "social and interest group activity" surveys in waves 1-5, 7, 9, 11, 13, 15, and 17. However, some groups, such as professional organisation, pensioners organisations and Scout/Guides organisations, are excluded in the first two surveys and were thus not introduced until wave 3. Since I focus on job market outcomes, I choose respondents aged 18-65 who are not in full-time education at waves 3-5, 7, 9, 11, 13, 15, and 17 as my sample.

Given the previous selection criteria, I use 71,082 observations. Among these, approximately 94% of the respondents are employed; approximately 80% of those are full-time workers and 20% are part-time workers. Among the part-time workers, more than 87% are female. I only concentrate on whether social interactions can influence the probability of being a full-time worker. After dropping the part-time workers, I have a sample of 54,405 observations. I consider an individual's employment status as the outcome rather than his or her transition status from unemployed to employed. I have two reasons for this approach. First, focusing on the transition will significantly reduce the sample, given that the majority of the respondents are employed. Second, concentrating on the transition from unemployment to employment will potentially generate endogeneity issues due to unobserved heterogeneity. Indeed, as Heckman (1981) notes, the issue of initial conditions[17] can arise since being non-employed can be serially correlated with the employment process.

3.2.2 Descriptive statistics

Appendix C1 presents the sample's summary statistics. First, I report statistics concerning the employment status of the respondents. The full sample consists of 54,405 observations. Of those observations, approximately 93.4% are in full-time employment. The remaining 6.6% of observations are unemployed. The mean age of the respondents in this sample is approximately 38 years old, and 38.5% of participants are females. I also report respondents' characteristics such as ethnicity, education level, family structure, health, and region of residence. The social interaction index of the full sample is 0.691 on average. The sports clubs have the highest average active membership (0.229). They are followed by

[17] If the error terms are serially correlated, the initial conditions would not exogenous.

social groups with an average active membership of 0.091, which suggests that approximately 9% of respondents in the sample are involved in a social group. Note that the average level of social interactions 0.708 for employed individuals and 0.464 for unemployed ones. This is perhaps the first indication of a link between the extent of social interactions and employment status – a link that I will explain systematically by means of the joined econometric approach that I summarise below.

3.3 Methodology

The correlation between social interaction and employment status will be investigated by means of the following econometric model:

$$Y_{i,t} = F\left(X_{i,t}, SI_{i,t}\right) \quad (1)$$

where $Y_{i,t}$ stands for the individual i's employment status at time t, which is a binary variable. It takes the value one if the individual is in paid full-time employment and zero otherwise. The variable $SI_{i,t}$ represents the social interaction index for individual i at time t. The vector $X_{i,t}$ summarises the individual characteristics that would affect the probability of having full-time employment for individual i at time t. These characteristics include age, age squared, splines of six education levels (higher degree, 1st degree, hnc, a level, o level, cse), and dummies for gender, race, current marital status, having a child, health status and region of residence. The time variable t takes year values 1993, 1994, 1995, 1997, 1999, 2001, 2003, 2005, and 2007. F (.) denotes the function form, which can be either linear or logistic.

The main identification issue is the potential endogeneity of social interactions. Since the active group memberships of each respondent are not randomly assigned, some unobserved individual characteristics affecting the individual's active group memberships might also determine his or her employment status; therefore, endogeneity may arise. For example, a sociable individual (unobserved individual characteristic) who might have a higher probability of being employed could also have more active group memberships. This would result in an upwardly biased social interaction effect. This also has the potential for reverse causality between social interaction and an individual's job market prospects. Therefore, I use the fixed effects estimation to eliminate unobserved individual heterogeneity bias. Additionally, the instrumental variable approach is applied to solve the issue of reverse causality by employing an average level of social interaction among a population with the same occupation who live in the same region and respond to the survey in the same year as the instrumental variable of the social interaction index.

3.3.1 Logistic estimator

Since the dependent variable is a binary variable, the typical method of logistic estimation is applied in the following function form:

$$Y_{i,t} = \frac{\exp(X_{i,t}, SI_{i,t})}{1+\exp(X_{i,t}, SI_{i,t})} \quad (2)$$

where exp stands for the exponential form. The specifications of $SI_{i,t}$ and $X_{i,t}$ are the same as those used in equation (1). However, a logistic estimation cannot effectively address endogeneity issues that are a result of unobserved heterogeneity and potential reverse causality. The conditional logistic model is used to eliminate unobserved heterogeneity, while this procedure captures the social interaction effect on employment transition rather than employment status.

3.3.2 Fixed effects estimator

To address unobserved heterogeneity, I apply the fixed effects estimation method. The data sample contains 54,405 observations of 13,071 individuals who participated in the survey for more than one wave, which can help to capture the within-individual variation in social interaction over time and across different respondents. At the same time, this approach can effectively eliminate time-invariant unobserved heterogeneity, which might be correlated with individual social interactions. To apply the fixed effects estimation, I employ the following estimation equation:

$$Y_{i,t} = \alpha + \beta X_{i,t} + \gamma SI_{i,t} + a_i + \varepsilon_{i,t} \quad (3)$$

where $\varepsilon_{i,t}$ is the idiosyncratic error term and should be uncorrelated with each explanatory variable across all time periods. Additionally, $\varepsilon_{i,t}$ is homoscedastic and serially uncorrelated. The term a_i captures the unobserved effect that describes unobserved heterogeneity characteristics influencing the individual i's employment status. The specification of $X_{i,t}$ and $SI_{i,t}$ are again the same as those explained in equation (1).

3.3.3 Instrumental variables (IV) estimator

The fixed effects estimator can be biased if the social interaction index is not strictly exogenous and depends on past values of the dependent variable, such as $SI_{i,t}$ being affected by $Y_{i,t}$ and/or $Y_{i,t-1}$. To address the endogeneity problem for $SI_{i,t}$, the average value of social interaction for the endogenous variable is considered to be the instrumental variable. For example, $\widetilde{SI_{i,t}}$ can be the instrumental variable for $\Delta SI_{i,t}$, and $\widetilde{SI_{i,t}}$ is estimated by averaging the social interaction level of the population who live in the same region, work in the same occupation and respond to the survey questions in the same year.

There are two critical conditions that must be met for a variable to be considered a valid instrumental variable. First, the instrumental variable must be correlated with the endogenous variable ($SI_{i,t}$). Second, the instrumental variable must not be correlated with the dependent variable ($Y_{i,t}$) or the error term ($\varepsilon_{i,t}$). Here, it is apparent that $\widetilde{SI_{i,t}}$ is correlated with $SI_{i,t}$. The only issue is verifying that $\widetilde{SI_{i,t}}$ is uncorrelated with $Y_{i,t}$ or $\varepsilon_{i,t}$ even though an individual's current employment status $Y_{i,t}$ might affect his or her current social interaction level $SI_{i,t}$. The occupational regional average level of social interaction cannot possibly be decided by one's employment status. Therefore, $\widetilde{SI_{i,t}}$ is a valid instrumental variable for $SI_{i,t}$. The econometric model for applying the instrumental variable can be written as:

First stage:

$$\widehat{SI}_{i,t} = \alpha' + \beta' x_{i,t} + \gamma' \widetilde{SI_{i,t}} + a_i' + \vartheta_{i,t} \tag{5}$$

And the second stage:

$$Y_{i,t} = \alpha + \beta x_{i,t} + \gamma \widehat{SI}_{i,t} + a_i + \mu_{i,t} \tag{6}$$

where ϑ, μ are composite error terms that are uncorrelated with $x_{i,t}, \widehat{SI}_{i,t}$.

3.4 Estimation results

This section formally presents the results of the empirical investigation. Furthermore, it extends the analysis by investigating the possibility of heterogeneous social interaction effects according gender difference as well as differences in an individual's stage of life. This is justified because the type of organisations that women prefer to join could be very different than those that men join. Similarly, an individual would prefer to join different organisations at different ages according to their preferences and needs. Therefore, the social interaction effect could be heterogeneous for different gender groups and at different ages.

3.4.1 Logistic estimator

Regarding the binary dependent variable model, I begin with the logistic estimation to investigate the social interaction effect on labour market participation. The first column of Table 3.1.A shows that social interaction is positively and significantly associated with being employed full time. The second column implies that an additional active group membership results in a 1.1% higher probability of being engaged in full-time employment[18]. The coefficients of the conditional logistic and the conditional logit margins models are positive yet not statistically significant. Nevertheless, the coefficients of these two models capture the influence of social interaction on the individuals who undergo employment transition, which means that the social interaction effect is positively related to the probability of transitioning from unemployment to employment for an individual but is not statistically significant.

[18] The estimation results from the logistic model only suggest the direction of the correlation between employment status and all the controls, while the estimation results from logistic margins reveal not only the direction but also the magnitude of the effect.

Table 3. 1. A. Correlation between social interaction and employment status in the nonlinear model

	(1) Logistic model	(2) Logistic margins	(3) Conditional logit model	(4) Conditional logit margins
Social interaction	0.231***	0.011***	0.025	0.00002
	(0.026)	(0.001)	(0.048)	(0.000048)
Age	0.171***	0.008***	0.381***	0.00035
	(0.011)	(0.001)	(0.032)	(0.00024)
Age2	-0.002***	-0.000***	-0.004***	-3.68e-06
	(0.000)	(0.000)	(0.000)	(2.53e-06)
Higher degree	1.542***	0.041***	1.131	0.001
	(0.146)	(0.002)	(0.877)	(0.001)
1st degree	1.425***	0.045***	-0.116	-0.0001
	(0.074)	(0.002)	(0.549)	(0.0005)
Hnd, hnc, teaching	1.318*** (0.088)	0.040*** (0.002)	0.347 (0.553)	0.0003 (0.0005)
A level	1.320***	0.047***	0.406	0.0003
	(0.059)	(0.002)	(0.426)	(0.0004)
O level	1.048***	0.042***	0.494	0.0004
	(0.051)	(0.002)	(0.447)	(0.0004)
Cse	0.806***	0.028***	0.014	0.00001
	(0.077)	(0.002)	(0.734)	(0.0006)
Married	0.938***	0.055***	0.390***	0.0003
	(0.045)	(0.003)	(0.116)	(0.0003)
Ethnic	0.671***	0.043***		
	(0.087)	(0.007)		
Anychild	-0.537***	-0.028***	-0.361***	-0.0003***
	(0.049)	(0.003)	(0.117)	(0.0002)
Female	0.191***	0.009***		
	(0.039)	(0.002)		
Region	-0.016	-0.001	-0.245*	-0.0002
	(0.013)	(0.001)	(0.139)	(0.0003)
Health	-0.975***	-0.070***	-0.616***	-0.0006
	(0.066)	(0.007)	(0.139)	(0.0004)
Sample Size	49227	49227	6857	6857
LR chi2	2280.104		291.106	
prob > chi2	0.000		0.000	

* p<0.10, ** p<0.05, *** p<0.01

Notes: The time periods of the sample are 1993-1995, 1997, 1999, 2001, 2003, 2005, and 2007. The dependent variable is employment status, which takes a value of one if the individual is engaged in paid full-time employment and zero otherwise. Social interaction is proxied by active group membership. Age represents the respondent's age. Higher degree, 1st degree, Hnc, A level, O level, and Cse are all dummy variables that represent the six levels of education. Married is a dummy variable that indicates one's marriage status. Ethnic is a dummy variable that takes a value of one if the individual is white and zero otherwise. Anychild and Female are dummy variables that indicate whether the respondent has a child or not and whether the respondent is female or not. Region represents the respondent's region of residence, which takes the value 1 (London), 2 (S England), 3 (N England), 4 (Wales), 5 (Scotland), or 6 (N Ireland). Health is a dummy variable and represents the health status of the respondent. It takes a value of one if the individual is currently experiencing anxiety and depression when answering the survey and zero otherwise.

3.4.2 Fixed effects estimator

As discussed, the fixed effects estimation model is adopted to address the endogeneity of the social interaction effect in order to eliminate the potential correlation with unobserved heterogeneity. Table 3.1.B illustrates how the social interaction and other control variables affect the likelihood of having full-time employment. In addition, Table 3.2 shows how the coefficients vary for male and female workers separately. Moreover, Table 3.3 describes the lifecycle effect of social interaction on the possibility of being employed full-time.

Once I control for unobserved heterogeneity, the estimated coefficient of social interaction drops from 0.01 (pooled OLS) to 0.001 (fixed effects). Here, 0.001 means that one additional unit improvement of social interaction leads to the probability of the respondents being employed full-time increasing by 0.1%. As some unobserved individual characteristics could determine both an individual's group membership profiles and employment status, it is unsurprising that the pooled OLS estimator is much bigger than the one obtained from the linear fixed effects estimation. According to the results from the pooled OLS and the fixed effects estimations, it can be concluded that a better social interaction level will lead to a higher probability of labour market participants obtaining full-time jobs.

All the estimated coefficients of other non-social interaction control variables are consistent with the theoretical predictions and existing empirical findings (Chapman *et al.* 2001; Birch 2002). As shown in the second column of Table 3.1.B, age is positively related to the possibility of being employed full time, while the square of age is negatively (the value is close to 0) related to the probability of being employed full time. This implies that the probability of having employment increases with working experience at a decreasing rate. Different education levels, ranging from secondary education to higher education, show different strengths of association with being employed full time. In general, higher levels of education are more strongly associated with being employed, with higher degrees having the strongest effect (4.6%) and lower secondary education qualification (CSE) having the weakest (-1.8%). People who are married are more likely to be employed. However, having children or having health problems are negatively associated with full-time employment.

To control for heterogeneous gender effects, I explore the impact of social interaction on labour market status for different gender groups. The estimation results are shown in Table 3.2. The coefficients of social interaction from a pooled OLS approach reveals that increased social interaction is associated with the increased probability of being employed for both males and females. Specifically, a one unit increase in social interaction results in a 1% and 1.1% higher possibility of having full-time employment for each individual, which is statistically significant. However, the coefficients of social interaction from the fixed effects estimation are statistically not significant, which suggests that social interaction does not affect the labour market outcome if we consider the female and male groups separately. Regarding the other control variables, the fixed effects estimator reveals that education levels play a more important role in being employed for males. Married men are also more likely to be employed (within the male group) than married women (within the female group). The remaining control variables play similar roles in both gender groups.

To investigate the effect of social interactions on labour market outcomes at different stages of the lifecycle, I divide the sample into different age groups: age 18-24, age 25-29, age 30-34, age 35-39, age 40-44, age 45-49, age 50-54 and age 55-65. In Table 3.3[19], the estimators from pooled OLS models reveal that the positive correlation between social interaction and the probability of having full-time employment is generally statistically significant. The fixed effects estimators also show the various social interaction effects for different age groups. The coefficients reveal that the effect of social interaction is positively related to the possibility of being employed when the individual is at age 30-34, age 40-44 and age 50-54 and that this effect is not statistically significant. For the other age groups, the fixed effects coefficients illustrate the negative (yet generally not significant) influence of social interaction on individuals' employment status. Notably, at age 55-65, the fixed effects estimator shows that social interaction and

[19] The full regression results can be checked in Appendix C.2.

individual labour market outcome are negatively related and statistically significant. This could be because individuals are gradually more inactive in terms of social interaction in this age group.

Table 3. 1. B. Correlation between social interaction and employment status in the linear model

	(1) Pooled OLS	(2) FE	(3) FEIV
Social interaction	0.010***	0.001	0.347***
	(0.001)	(0.001)	(0.018)
Age	0.012***	0.016***	0.015***
	(0.001)	(0.001)	(0.002)
Age2	-0.0001***	-0.0002***	-0.0001***
	(0.000)	(0.000)	(0.000)
Higher degree	0.100***	0.046*	-0.000
	(0.007)	(0.024)	(0.040)
1st degree	0.099***	0.022	-0.009
	(0.004)	(0.019)	(0.032)
Hnd, hnc,	0.092***	0.037*	0.041
teaching	(0.005)	(0.021)	(0.034)
A level	0.094***	0.042**	0.067**
	(0.004)	(0.017)	(0.029)
O level	0.080***	0.038**	0.024
	(0.003)	(0.017)	(0.029)
Cse	0.063***	-0.018	-0.014
	(0.005)	(0.029)	(0.048)
Married	0.060***	0.014***	0.036***
	(0.003)	(0.004)	(0.007)
Ethnic	0.052***		
	(0.006)		
Anychild	-0.030***	-0.014***	-0.033***
	(0.003)	(0.003)	(0.006)
Female	0.011***		
	(0.002)		
Region	-0.001	-0.014***	-0.020**
	(0.001)	(0.005)	(0.008)
Health	-0.083***	-0.027***	-0.023**
	(0.005)	(0.006)	(0.009)
Constant	0.525***	0.597***	0.335***
	(0.015)	(0.029)	(0.050)
Sample Size	49227	49227	50375
r-square	0.050	0.025	0.016

* p<0.10, ** p<0.05, *** p<0.01

Notes: The time periods of the sample are 1993-1995, 1997, 1999, 2001, 2003, 2005, and 2007. The dependent variable is employment status, which takes a value of one if the individual is engaged in paid full-time employment and zero otherwise. Social interaction is proxied by active group membership. Age represents the respondent's age. Higher degree, 1st degree, Hnc, A level, O level, and Cse are all dummy variables that represent the six levels of education. Married is a dummy variable that indicates one's marriage status. Ethnic is a dummy variable that takes a value of one if the individual is white and zero otherwise. Anychild and Female are dummy variables that indicate whether the respondent has a child or not and whether the respondent is female or not. Region represents the respondent's region of residence, which takes the value 1 (London), 2 (S England), 3 (N England), 4 (Wales), 5 (Scotland), or 6 (N Ireland). Health is a dummy variable and represents the health status of the respondent. It takes a value of one if the individual is currently experiencing anxiety and depression when answering the survey and zero otherwise.

Table 3. 2. Correlation between social interaction and employment status for different gender

	(1) Pooled OLS female	(2) Pooled OLS male	(3) Fe female	(4) Fe male	(5) Feiv female	(6) Feiv male
Social interaction	0.010***	0.011***	0.003	-0.001	0.409***	0.311***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.034)	(0.021)
Age	0.012***	0.013***	0.013***	0.019***	0.012***	0.017***
	(0.001)	(0.001)	(0.002)	(0.001)	(0.003)	(0.002)
Age2	-0.0001***	-0.0001***	-0.0002***	-0.0002***	-0.0001**	-0.0001***
	(0.00001)	(0.00001)	(0.00001)	(0.00001)	(0.00004)	(0.00002)
Higher degree	0.090***	0.104***	0.027	0.070**	-0.061	0.044
	(0.010)	(0.008)	(0.036)	(0.032)	(0.069)	(0.050)
1st degree	0.086***	0.104***	-0.008	0.051*	-0.075	0.043
	(0.006)	(0.005)	(0.028)	(0.027)	(0.054)	(0.041)
Hnd, hnc, teaching	0.077***	0.100***	-0.015	0.088***	-0.049	0.115***
	(0.008)	(0.006)	(0.030)	(0.028)	(0.057)	(0.043)
A level	0.081***	0.100***	-0.012	0.085***	0.015	0.107***
	(0.006)	(0.005)	(0.025)	(0.023)	(0.049)	(0.036)
O level	0.070***	0.085***	0.003	0.067***	-0.021	0.055
	(0.005)	(0.004)	(0.025)	(0.024)	(0.047)	(0.036)
Cse	0.046***	0.071***	-0.187***	0.090**	-0.111	0.061
	(0.009)	(0.007)	(0.045)	(0.038)	(0.086)	(0.058)
Married	0.049***	0.068***	0.007	0.019***	0.020*	0.044***
	(0.004)	(0.004)	(0.006)	(0.005)	(0.011)	(0.008)
Ethnic	0.053***	0.050***				
	(0.010)	(0.008)				
Anychild	-0.038***	-0.029***	-0.020***	-0.013***	-0.058***	-0.026***
	(0.004)	(0.004)	(0.006)	(0.004)	(0.011)	(0.007)
Region	0.001	-0.002**	-0.008	-0.019***	-0.005	-0.030***
	(0.001)	(0.001)	(0.008)	(0.006)	(0.015)	(0.010)
Health	-0.066***	-0.105***	-0.018**	-0.038***	-0.007	-0.040***
	(0.007)	(0.008)	(0.007)	(0.008)	(0.014)	(0.013)
Constant	0.560***	0.506***	0.728***	0.512***	0.404***	0.283***
	(0.024)	(0.019)	(0.046)	(0.037)	(0.092)	(0.059)
Sample Size	19146	30081	19146	30081	19602	30773
population size			5398	6599	5614	6906
r-square	0.042	0.056	0.006	0.041	0.009	0.028

* p<0.10, ** p<0.05, *** p<0.01

Notes: The time periods of the sample are 1993-1995, 1997, 1999, 2001, 2003, 2005, and 2007. The dependent variable is employment status, which takes a value of one if the individual is engaged in paid full-time employment and zero otherwise. Social interaction is proxied by active group membership. Age represents the respondent's age. Higher degree, 1st degree, Hnc, A level, O level, and Cse are all dummy variables that represent the six levels of education. Married is a dummy variable that indicates one's marriage status. Ethnic is a dummy variable that takes a value of one if the individual is white and zero otherwise. Anychild and Female are dummy variables that indicate whether the respondent has a child or not and whether the respondent is female or not. Region represents the respondent's region of residence, which takes the value 1 (London), 2 (S England), 3 (N England), 4 (Wales), 5 (Scotland), or 6 (N Ireland). Health is a dummy variable and represents the health status of the respondent. It takes a value of one if the individual is currently experiencing anxiety and depression when answering the survey and zero otherwise.

Table 3. 3. Correlation between social interaction and employment status at different age stage by pooled OLS regression model

	(1) Pooled OLS	(2) Fixed effects	(3) Fixed effect IV
Age 18-24	0.030***	-0.002	1.389***
	(0.006)	(0.009)	(0.309)
Age 25-29	0.010**	-0.007	0.790***
	(0.004)	(0.006)	(0.249)
Age 30-34	0.009***	0.002	0.240***
	(0.003)	(0.004)	(0.054)
Age 35-39	0.009***	-0.002	0.117***
	(0.003)	(0.003)	(0.026)
Age 40-44	0.012***	0.005	0.202***
	(0.003)	(0.004)	(0.037)
Age 45-49	0.008***	-0.002	0.234***
	(0.003)	(0.003)	(0.045)
Age 50-54	0.013***	0.007	0.248***
	(0.003)	(0.005)	(0.040)
Age 55-65	0.003	-0.007*	0.326***
	(0.004)	(0.004)	(0.084)

* p<0.10, ** p<0.05, *** p<0.01.

3.4.3 IV estimator

The third approach to investigating the correlation between social interaction and employment status is the fixed effects instrumental variable (IV) estimation. As discussed in section 3.3, the estimation results can suffer from a potential endogeneity problem. I address this issue by using the average level of social interaction ($\widetilde{SI_{i,t}}$) as the instrumental variable to instrumentalise the endogenous social interaction index ($SI_{i,t}$). Unlike the previous approaches, the fixed effects IV estimator addresses all types of endogeneity issues, including unobserved heterogeneity and potential reverse causality.

As shown in Table 3.1.B, the coefficient of the IV estimation indicates that social interaction is significantly and positively correlated with the probability of being employed full time. Specifically, increasing active group memberships by one increases the probability of being employed by 34.7%. Here, the two-stage least square econometric method is applied. In the first stage, the instrumental variable ($\widetilde{SI_{i,t}}$) is statistically significantly and correlated with the social interaction at time t ($SI_{i,t}$), which can statistically demonstrate that the instrumental variable is valid since the instrumental variable is correlated with the endogenous variable[20]. The result of the second stage acquired by employing the predicted social interaction index ($\widehat{SI_{i,t}}$) from the first stage, which shows evidence of a positive statistically significant social interaction effect.

The last two columns of Table 3.2 show the social interaction effects on labour market outcomes when considering heterogeneous gender effects while employing the fixed effects IV model. The estimates of social interaction are all positive and, generally, statistically significant. One additional active group membership leads to a 40.9% increased probability of having full-time employment for females and a 31.1% increase for males. This result is similar to the findings from pooled OLS models.

Regarding the lifecycle effect of social interaction, the coefficients estimated by the fixed effects IV approach are displayed in Table 3.3 (3). The social interaction effect is statistically significant for individuals for all age groups. Specifically, in the earlier age group, 18-24, the influence of social interaction is the most pronounced. With every additional active group membership, the probability of being employed increases by 138.9%. This social interaction effect becomes least important when the individual reaches the 35-39 age group. In that group, the probability of having full-time employment increases by 11.7% for each additional active group membership.

3.5 Social interaction indices

The previous sections identified the overall social interaction effects on job market outcomes. However, the social interaction index used thus far is measured as the sum of active group memberships regardless of the types of groups. Nevertheless, one may argue that individuals in different groups may reap different benefits depending on their type (e.g., sports clubs and trade unions).

As shown in Appendix C1, the employment sample has a higher mean value in each single group membership profile than the unemployment sample except

[20] The results of the first stage of this 2SLS regression can be seen in the first column of Appendix C.3.

for voluntary groups. Nevertheless, after controlling for the individual characteristics that would affect an individual's labour market outcome (e.g., education, age and marital status), not all the active group memberships significantly affect individuals' labour market outcomes according to the fixed effects IV estimation (shown in Appendix C.4 and the first stage results shown in Appendix C.5). Among all the active group memberships, membership in trade unions has the most significant positive effect on an individual's employment status. With one additional active membership in a trade union, the probability of having employment increases 139.6%. The likelihood of being employed is reduced 114.6% for each increase in active membership in a voluntary group. However, an individual may be less likely to join only one group/organisation in his or her lifetime. It would be instinctive to explore the effects of social interactions on job market outcomes within different sets of groups.

3.5.1 Principal component analysis (PCA)

To capture active membership in different sets of groups, I employ the PCA method. Through this method, I build different social interaction (SI) indices. PCA is a multivariate statistical technique that aims to build indices to measure different dimensions of the original data. It accomplishes this by reducing the number of variables in a dataset into a smaller number of dimensions. Currently, the PCA is broadly used to build indices for certain economic and social characteristics, such as socio-economic status and education level (Gwatkin *et al*. 2000; Filmer and Pritchett 2001; McKenzie 2003). Mathematically, the PCA constructs uncorrelated indices or components from an initial set of n correlated variables. Each component is a linear weighted combination of the initial variables. For instance, for a set of variables from x_1 to x_n,

$$
\begin{aligned}
PC_1 &= a_{11}X_1 + a_{12}X_2 + \cdots + a_{1n}X_n \\
&\;\;. \\
&\;\;. \\
&\;\;. \\
PC_m &= a_{m1}X_1 + a_{m2}X_2 + \cdots + a_{mn}X_n
\end{aligned}
\tag{7}
$$

where a_{mn} represents the weight of the mth principal component and the nth variable. $a_{11}^2 + a_{12}^2 + \cdots + a_{1n}^2 = 1$.

The weights for each principal component are decided by the eigenvectors of the correlation matrix. If the original data were standardised, the weights are given by the covariance matrix. The variance (λ) for each principal component is equal to the eigenvalue of the corresponding eigenvector. The components are ordered and orthogonal. The first component (PC_1) captures the largest possible amount of variation for the original data. The second component (PC_2) explains the additional variation that is not captured by PC_1. However, PC_2 has less explaining power than PC_1 for the original data, and PC_2 is completely uncorrelated with PC_1. Subsequent components have the same property. Thus, each component captures smaller and smaller proportions of the variation of the original variables and describes an additional dimension for the original data.

Before the application of the PCA, the variables used to build the SI indices need to be prepared. Here, each active group membership is considered. The groups are political parties, trade unions, environment groups, parents' associations, tenants' or residents' groups, religious groups, voluntary service groups, professional organisations, other community groups, other social groups and sport clubs. I exclude some groups, such as pensioner organisations, Scout/Guides organisations, women's institutes and any other groups as the elements of the variables put into the PCA programme. These groups are excluded because membership in them is restricted to specific parts of the population such as children, the elderly or females.

3.5.2 Application of the PCA

Since the values of variables in my case are ordinal numbers, the correspondence analysis PCA[21] (Lebart 2013) is applied. The number of principal components to be extracted determined based on the number of components with a corresponding eigenvalue above one. Three components are chosen for

[21] This is a kind of PCA technique that is used to deal with dummies and ordinal numbers.

extraction here. The PC_1 index captures active membership in political, environmental, tenants′ or residents′, voluntary service, and other community groups. The PC_2 index measures active membership in trade unions, as well as political, religious and other social groups. The PC_3 index includes membership profiles in professional organisations and sport clubs. The table of correspondence analysis PCA eigenvector, factor loadings and factor scoring coefficients can be found in Appendix C6. Moreover, these three indices built by the correspondence analysis PCA approach are justified by the Kaiser-Meyer-Olkin (KMO) test.[22]

The estimation results of the three SI indices are shown in Table 3.4. I start with the most general regression method of a pooled OLS, initially ignoring the possible endogeneity issues. The coefficients of the second and third indices illustrate the significant positive effect on the probability of being employed full time. One standard deviation increase in the PC_2 index results in a 0.9% higher probability of being employed. With regard to the PC_3 index, one standard deviation increase leads to the possibility of being employed increasing by 1.3%. The coefficient of the first index is negative yet not significant from the pooled OLS model.

In addition, to eliminate the unobserved heterogeneity, fixed effects estimations are applied. By using the fixed effects approach, the results show that only the second SI index (PC_2) plays a positive and significant role in one's employment status. A one standard deviation increase of the PC_2 index increases in the probability of being employed by 0.45%. To address all endogeneity problems in terms of unobserved heterogeneity and potential reverse causality, the fixed effects IV estimation is used. The all three SI indices are positively and significantly related to the labour market outcome. Particularly with regard to the value of coefficient, the second index (PC_2) once again plays the most effective role in an individual's employment status. When I consider the standard deviation change, both the second and third SI indices contribute a vital effect.

[22] The KMO test can determine whether the constructed indices are valid. The acceptable level for the KMO test is 0.5, which implies the component or factor analysis is useful for the original data. In my case, the result of the KMO test is 0.76.

Specifically, a one standard deviation increase of the PC_2 index and the PC_3 index results in a 32% and 33% higher probability of having full-time employment, respectively. The coefficient of the first index, PC_1, reveals that the probability of being employed full time increases by 5.8% with a one standard deviation increase in the PC_1.

The aforementioned results indicate that the third SI index, which includes active memberships in professional organisations and sports clubs, is the most effective in regard to the job market outcomes. As shown in Appendix C.6, active membership in professional and sport groups is positively associated with the scores of the third components. Specifically, a one standard deviation increase in active memberships in professional organisations and sport clubs leads to the standardised scores of the PC_3 index increasing by 0.474 and 0.77 points, respectively. The network sizes of sport clubs are also the largest; approximately 23% of participants from the full sample are involved in a sport group. Thus, these results offer support to the model of Calvo-Armengol and Zenou (2005), who suggest that network size would make a difference in job market success.

Table 3. 4. Correlation between pc1/pc2/pc3 indices and employment status

	(1) pooled OLS	(2) pooled OLS	(3) pooled OLS	(4) fe	(5) fe	(6) fe	(7) feiv	(8) feiv	(9) feiv
Pc1	-0.002			-0.004			0.286***		
	(0.006)			(0.006)			(0.052)		
Pc2		0.036***			0.017***			1.202***	
		(0.004)			(0.005)			(0.059)	
Pc3			0.036***			0.002			0.920***
			(0.003)			(0.003)			(0.045)
Age	0.013***	0.012***	0.012***	0.016***	0.016***	0.016***	0.015***	0.021***	0.017***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)
Age2	-0.0001***	-0.0001***	-0.0001***	-0.0001***	-0.0002***	-0.0002***	-0.0002***	-0.0002***	-0.0001***
	(9.09e-06)	(9.09e-06)	(9.08e-06)	(0.0001)	(0.00001)	(0.00001)	(0.00001)	(0.00002)	(0.00002)
Higher degree	0.108***	0.111***	0.100***	0.047*	0.045*	0.046*	0.036	-0.041	-0.044
	(0.007)	(0.006)	(0.006)	(0.024)	(0.024)	(0.024)	(0.025)	(0.041)	(0.042)
1st degree	0.104***	0.108***	0.098***	0.022	0.021	0.022	0.018	-0.050	-0.015
	(0.004)	(0.004)	(0.004)	(0.019)	(0.019)	(0.019)	(0.020)	(0.033)	(0.034)
Hnd, hnc, teaching	0.097***	0.099***	0.092***	0.037*	0.037*	0.037*	0.031	0.026	0.057
	(0.005)	(0.005)	(0.005)	(0.021)	(0.021)	(0.021)	(0.021)	(0.035)	(0.036)
A level	0.098***	0.099***	0.094***	0.042**	0.041**	0.042**	0.045**	-0.009	0.071**
	(0.004)	(0.004)	(0.004)	(0.017)	(0.017)	(0.017)	(0.018)	(0.029)	(0.030)
O level	0.082***	0.083***	0.080***	0.038**	0.037**	0.038**	0.037**	-0.014	0.027
	(0.003)	(0.003)	(0.003)	(0.017)	(0.017)	(0.017)	(0.018)	(0.029)	(0.030)
Cse	0.064***	0.064***	0.063***	-0.018	-0.019	-0.018	-0.020	-0.116**	0.003
	(0.005)	(0.005)	(0.005)	(0.029)	(0.029)	(0.029)	(0.030)	(0.049)	(0.050)
Married	0.060***	0.060***	0.060***	0.014***	0.015***	0.014***	0.016***	0.026***	0.040***
	(0.003)	(0.003)	(0.003)	(0.004)	(0.004)	(0.004)	(0.004)	(0.007)	(0.007)
Ethnic	0.052***	0.050***	0.050***						
	(0.006)	(0.006)	(0.006)						
Anychild	-0.029***	-0.027***	-0.029***	-0.014***	-0.013***	-0.014***	-0.020***	0.026***	-0.002
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)	(0.006)	(0.006)
Female	0.010***	0.013***	0.013***						
	(0.002)	(0.002)	(0.002)						
Region	-0.001*	-0.001*	-0.001	-0.014***	-0.014***	-0.014***	-0.015***	-0.017**	-0.020**
	(0.001)	(0.001)	(0.001)	(0.005)	(0.005)	(0.005)	(0.005)	(0.008)	(0.009)
Health	-0.083***	-0.083***	-0.081***	-0.027***	-0.027***	-0.027***	-0.028***	-0.018*	-0.025***
	(0.005)	(0.005)	(0.005)	(0.006)	(0.006)	(0.006)	(0.006)	(0.009)	(0.010)
Constant	0.524***	0.524***	0.521***	0.597***	0.595***	0.597***	0.597***	0.413***	0.306***
	(0.015)	(0.015)	(0.015)	(0.029)	(0.029)	(0.029)	(0.030)	(0.049)	(0.052)
Sample Size	49227	49227	49227	49227	49227	49227	50375	50375	50375
Population size				11,997	11,997	11,997	12,520	12,520	12,520
R-square	0.0491	0.0506	0.0517	0.025	0.025	0.025	0.015	0.004	0.022

* $p<0.10$, ** $p<0.05$, *** $p<0.01$

Notes: The time periods of the sample are 1993-1995, 1997, 1999, 2001, 2003, 2005, and 2007. The dependent variable is employment status, which takes a value of one if the individual is engaged in paid full-time employment and zero otherwise. Age represents the respondent's age. Higher degree, 1st degree, Hnc, A level, O level, and Cse are all dummy variables that represent the six levels education levels. Married is a dummy variable that indicates one's marriage status. Ethnic is a dummy variable that takes a value of one if the individual is white and zero otherwise. Anychild and Female are dummy variables that indicate whether the respondent has a child or not and whether the respondent is female or not. Region represents the respondent's region of residence, which takes the value 1 (London), 2 (S England), 3 (N England), 4 (Wales), 5 (Scotland), or 6 (N Ireland). Health is a dummy variable and represents the health status of the respondent. It takes a value of one if the individual is currently experiencing anxiety and depression when answering the survey and zero otherwise.

3.6 Match quality

The previous analysis demonstrated that social interactions could affect employment status. In this section, I investigate the influence of social interactions on employment characteristics such as wages.

Compared with individuals who have fewer social interactions, those with more social interactions should receive more information. Presumably, this leads to relatively higher wages since a person with more social interactions has a larger set of choices. Generally, the reservation wage would increase with the probability of receiving job offers (Devine and Kiefer 1991), thus indicating that the larger set of choices may increase the prospect of a higher salary. Of course, a counterargument is that some workers may treat informal networks as a last resort, an outcome that could be associated with low wages (Loury 2006). Indeed, Bentolila *et al*. (2010) reveal that the information circulated within the social network may not exactly match the ability of the job-seeker, thus leading to an ambiguous effect on wages.

Indeed, previous research has shown mixed empirical results. On the one hand, the positive correlation between social interactions and wages is captured by Simon and Warmer (1992), Marmaros and Sacerdore (2002), Loury (2006). On the other hand, a negative correlation has been shown by Pistaferri (1999), Bentolila *et al*. (2010), Goel and Lang (2012). Finally, some researchers find no significant interaction between the two (Bridges and Villemez 1986; Holzer 1987; Marsden and Hulbert 1988).

The longitudinal aspect of the BHPS allows me to investigate the association between social interactions and wages for each full-time respondent over time. The econometric model for the wage equation is given by the following:

$$\log(W_{i,t} | Y_{i,t} = 1) = \alpha + \beta X_{i,t} + \gamma SI_{i,t} + a_i + \varepsilon_{i,t} \qquad (8)$$

where $W_{i,t}$ denotes the current job's monthly earnings for individual i at period t. The error term is $\varepsilon_{i,t}$ and a_i is the unobserved individual fixed effect, which captures the unobserved heterogeneity effect of each individual on wages. The specifications of $\mathrm{SI}_{\mathrm{i,t}}$ and $\mathrm{X}_{\mathrm{i,t}}$ are the same as those used in equation (1). $Y_{i,t} = 1$

implies that the estimation of the effect of social interactions on wages is based only on full-time employed observations.

The first column in Table 3.5 shows that social interaction has a significant and positive effect on wages based on the pooled OLS regression. One additional active group membership is associated with a 1.6% higher monthly wage. While this result reveals a positive social interaction effect on wages, it should be taken with caution since some unobserved heterogeneity, which leads to a higher wage, may also motivate an individual to become a member of a particular group/organisation. Therefore, the fixed effects model is applied here to eliminate the problem of unobserved heterogeneity. The second column of Table 3.5 demonstrates the fixed effects estimation results. The fixed effects estimator shows that social interaction has a positive yet insignificant effect on an individual's monthly wages. Notably, active group membership might also be influenced by wages. Therefore, the fixed effects IV is employed to address potential reverse causality. The coefficient from the fixed effects IV approach reveals that social interaction is indeed positively and significantly associated with monthly wages. Every additional active group membership leads to an 11.2% increase in monthly wages.

I also explore the social interaction effect on the monthly wages for different gender groups. The estimation results are displayed in Table 3.6. I begin with the pooled OLS model to investigate the social interaction effect for the female and male groups while momentarily ignoring the unobserved individual characteristics. I find that social interaction has an equivalent positive and significant effect on female and male groups. One additional active group membership results in a 1.6% higher monthly wage for both gender groups. When I control for unobserved heterogeneity, I find that the social interaction effect is more important among males. This result is in line with the empirical work done by Loury (2004), who works with the National Longitudinal Survey of Youth, and suggests that social networks have significant wage effects for men. The monthly wage increases by 0.6% as the individual has an additional active group membership. The coefficients from the fixed effects IV estimation also demonstrate that the social interaction effect is positive and statistically significant for males and females, but this time, the social interaction influence is more pronounced in females. With every additional active group membership for women, their monthly wages increase by 1.7%. Therefore, after controlling for all the endogeneity problems, social interaction is found to play an important role in the individual's monthly wages, and this effect is more profound among females.

Furthermore, I investigate the influence of social interactions on wages for different types of occupations. Workers in different types of occupations may prefer particular groups. For instance, an individual who is employed as a manager may tend to join certain professional groups. Presumably, social interaction may play a different role in monthly wages for workers with different occupation types. In this sample, the occupation types are grouped into six subsamples: unskilled, partly skilled, skilled manual, skilled non-manual, managerial/technical and professional. As shown in the first column of Table 3.7, the coefficients of social interaction display the heterogeneous effects of social interaction on monthly wages for different occupations when using a pooled OLS model. Notably, social interaction has a negative and significant effect on monthly wages for the unskilled group. As an unskilled worker has one more active group membership, his or her monthly wages decrease by 1.9%. For the other occupation groups, social interaction effects are all positive when related to monthly wages, though they are not all statistically significant. In particular, social interaction shows the most important positive effect for the managerial/technical group, which has the highest and most significant coefficient in the SI index. With an additional active group membership, monthly wages increase 2.7% among the managerial/technical group. Regarding the problem of unobserved heterogeneity, the fixed effects estimation is employed. Once I control for the fixed effects, the coefficients of the SI index for all occupation subsamples are statistically insignificant except for the managerial/technical group. One additional active group membership results in a 1.5% higher monthly wage. To address the potential reverse causality, the fixed effects IV estimation is applied. However, the coefficients of social interaction are all statistically insignificant for all occupation types. Thus, worker types do not matter for the effect of social interaction on an individual's monthly wages.

Table 3. 5. Correlation between social interaction and wages

	(1) pooled OLS	(2) fe	(3) feiv
Social interaction	0.016***	0.002	0.112***
	(0.002)	(0.002)	(0.017)
Age	0.071***	0.130***	0.130***
	(0.002)	(0.002)	(0.002)
Age2	-0.001***	-0.001***	-0.001***
	(0.000)	(0.000)	(0.000)
Higher degree	0.848***	0.212***	0.182***
	(0.013)	(0.036)	(0.038)
1st degree	0.724***	0.139***	0.120***
	(0.008)	(0.029)	(0.031)
Hnd, hnc, teaching	0.533***	0.062**	0.053
	(0.010)	(0.031)	(0.033)
A level	0.386***	0.017	0.012
	(0.008)	(0.027)	(0.029)
O level	0.280***	0.024	0.011
	(0.007)	(0.027)	(0.028)
Cse	0.202***	0.070	0.061
	(0.011)	(0.044)	(0.046)
Married	0.072***	0.030***	0.036***
	(0.006)	(0.006)	(0.006)
Ethnic	0.067***		
	(0.014)		
Anychild	-0.002	-0.033***	-0.038***
	(0.005)	(0.005)	(0.005)
Female	-0.281***		
	(0.005)		
Region	-0.004**	-0.022***	-0.025***
	(0.002)	(0.008)	(0.008)
Health	-0.096***	-0.019**	-0.019**
	(0.011)	(0.008)	(0.009)
Constant	5.361***	3.850***	3.770***
	(0.031)	(0.045)	(0.048)
Sample Size	39994	40963	40963
Population size		10885	10885
R-square	0.34	0.038	0.043

* p<0.10, ** p<0.05, *** p<0.01

Notes: The time periods of the sample are 1993-1995, 1997, 1999, 2001, 2003, 2005, and 2007. The dependent variable is the respondent's monthly wage. Social interaction is proxied by active group membership. Age represents the respondent's age. Higher degree, 1st degree, Hnc, A level, O level, and Cse are all dummy variables that represent the six levels of education. Married and Ethnic are dummy variables that indicates one's marriage status and whether one is white or not. Anychild and Female are dummy variables that represent whether the respondent has a child or not and whether the respondent is female or not. Region represents one's region of residence, which takes a value of 1 (London), 2 (S England), 3 (N England), 4 (Wales), 5 (Scotland), or 6 (N Ireland). Health is a dummy variable. It takes a value of one if the individual is currently experiencing anxiety and depression when answering the survey and zero otherwise.

Table 3. 6. Correlation between social interaction and wages for different gender groups

	(1) pooled OLS female	(2) pooled OLS male	(3) fe female	(4) fe male	(5) feiv female	(6) feiv male
Social interaction	0.016***	0.016***	-0.003	0.006**	0.170***	0.080***
	(0.004)	(0.003)	(0.003)	(0.003)	(0.031)	(0.021)
Age	0.072***	0.075***	0.124***	0.133***	0.124***	0.133***
	(0.002)	(0.002)	(0.003)	(0.002)	(0.003)	(0.002)
Age2	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Higher degree	0.990***	0.743***	0.075	0.274***	0.020	0.256***
	(0.021)	(0.016)	(0.053)	(0.048)	(0.060)	(0.049)
1st degree	0.856***	0.621***	0.070	0.164***	0.031	0.156***
	(0.013)	(0.011)	(0.043)	(0.040)	(0.049)	(0.041)
Hnd, hnc, teaching	0.612***	0.474***	-0.030	0.125***	-0.054	0.122***
	(0.015)	(0.012)	(0.046)	(0.043)	(0.052)	(0.044)
A level	0.470***	0.324***	-0.052	0.059	-0.058	0.056
	(0.013)	(0.010)	(0.040)	(0.037)	(0.045)	(0.037)
O level	0.336***	0.249***	-0.061	0.093**	-0.086**	0.085**
	(0.011)	(0.009)	(0.038)	(0.037)	(0.043)	(0.038)
Cse	0.226***	0.189***	-0.016	0.120**	-0.006	0.106*
	(0.018)	(0.014)	(0.068)	(0.058)	(0.076)	(0.060)
Married	-0.003	0.125***	0.017**	0.033***	0.020**	0.039***
	(0.008)	(0.008)	(0.008)	(0.008)	(0.009)	(0.009)
Ethnic	0.024	0.086***				
	(0.021)	(0.018)				
Anychild	-0.082***	0.035***	-0.101***	0.005	-0.114***	0.002
	(0.009)	(0.007)	(0.008)	(0.007)	(0.009)	(0.007)
Region	-0.000	-0.006***	-0.027**	-0.019*	-0.031**	-0.021**
	(0.002)	(0.002)	(0.011)	(0.010)	(0.013)	(0.010)
Health	-0.071***	-0.126***	-0.021**	-0.017	-0.018	-0.018
	(0.014)	(0.018)	(0.011)	(0.014)	(0.012)	(0.014)
Constant	5.130***	5.251***	3.871***	3.862***	3.762***	3.803***
	(0.049)	(0.040)	(0.068)	(0.058)	(0.080)	(0.062)
Sample Size	16741	23253	17159	23804	17159	23804
Population size			5021	5864	5021	5861
R-square	0.3188	0.3063	0.003	0.099	0.006	0.103

* p<0.10, ** p<0.05, *** p<0.01

Notes: The time periods of the sample are 1993-1995, 1997, 1999, 2001, 2003, 2005, and 2007. The dependent variable is the respondent's monthly wage. Social interaction is proxied by active group membership. Age represents the respondent's age. Higher degree, 1st degree, Hnc, A level, O level, and Cse are all dummy variables that represent the six levels of education. Married is a dummy variable that indicates one's marriage status. Ethnic is a dummy variable that takes a value of one if the individual is white and zero otherwise. Anychild and Female are dummy variables that represent whether the respondent has a child or not and whether the respondent is female or not. Region represents the respondent's region of residence, which takes a value of 1 (London), 2 (S England), 3 (N England), 4 (Wales), 5 (Scotland), or 6 (N Ireland). Health is a dummy variable and represents the health status of the respondent. It takes a value one if the individual is currently experiencing anxiety and depression when answering the survey and zero otherwise.

Table 3. 7. Correlation between social interaction and wages for different occupation group

	(1) Pooled OLS	(2) Fixed effects	(3) Fixed effect IV
Unskilled	-0.019**	0.011	0.038
	(0.008)	(0.007)	(0.031)
Partly skilled	0.009**	0.004	0.031
	(0.004)	(0.003)	(0.022)
Skilled	0.005	-0.002	-0.014
manual	(0.005)	(0.005)	(0.034)
Skilled non-	-0.005	0.007	0.005
manual	(0.006)	(0.005)	(0.034)
Managerial/	0.027***	0.015*	-0.053
technical	(0.007)	(0.008)	(0.059)
Professional	0.009	0.010	0.002
	(0.020)	(0.022)	(0.063)

* p<0.10, ** p<0.05, *** p<0.01

3.7 Conclusion

In recent decades, the importance of the effect of social interaction on the labour market has attracted significant attention. Earlier studies suggest various mechanisms through which social interaction might affect an individual's labour market outcome. The transmission of information through social interactions has been viewed as a useful complementary approach to accessing to labour market. Individuals with better social interaction are presumably able to acquire more job information, which facilitates a job search and may eventually lead to a higher probability of being employed. Additionally, the rich job information provided by social interaction allows individuals to select among a set of different jobs, which may help an individual obtain a job with relatively higher wages. Nevertheless, the influence of social interaction on wages might be ambiguous since a mismatch can occur between the skills of individuals and the job information provided.

In this chapter, I contribute a new measure of social interaction based on an individual's number of active group membership by employing longitudinal data from the BHPS. Using various identification strategies, I provide robust evidence that social interaction is related to a higher probability of being employed full time. This social interaction effect is more important to the employment status of females and individuals in all age groups. The social interaction effect of different sets of groups on labour market outcomes is also investigated. Active group memberships in professional organisations and sport clubs have the largest effect. Regarding wages, social interaction shows a positive and statistically significant effect. The influence of social interaction on monthly wages is once again more pronounced among females. However, social interaction shows no significant effect on wages when I consider differences in occupation types.

Overall, this chapter is an initial study that considers the intensity of participation in groups (for each individual) and empirically investigates the correlation between social interaction (within weak ties) and labour market outcomes. To keep a sharp focus on the effect of social interaction (within groups) and labour market outcomes, I overlooked other mechanisms through which active group membership might affect labour market performance. For example, membership in certain special groups could function as a signal to represent certain personality traits, which could help individuals obtain a job. All these issues offer a scope for further research on the SI index and the correlation between social capital and labour market outcomes.

Conclusion

This thesis discusses issues such as social distance, trust and social interaction, with a particular interest in how they affect economic activity.

In Chapter 1, we examine the relationship between social distance and capital accumulation. We find that there is a possibility that social distance and the process of capital accumulation are jointly determined. The social and economic dimensions of a nation, rather than being independent, are closely interlinked. This analysis aims to contribute to the current understanding on the conditions that underpin the relation between social distance and economic development. It is shown by a dynamic model where the evolution of trust and the formation of capital are endogenous and mutually dependent. Both the current state of social distance and the current stage of economic development may be vital in propagating current difference among nations.

Chapter 2 challenges the classical way of measuring trust through trust surveys and experiments and is the first to provide a systematic analysis of constructing such an alternative measure of trust. The trust index is generated by considering the variables that have been shown to affect trust level. Such trust index is compiled after combining the weights of each variable, which are assigned by the factor analysis (FA) technique, with the data measurements of the trust indicators. Indeed, the ranking of countries in trust index is more consistent with people's perception than the ones in trust survey. Also this analysis extends to explore how trust impact FDI inflow and income inequality. As a result, countries with a higher trust level are more attractive for the foreign investors. With regard to income inequality, trust can mitigate the income inequality especially for the OECD countries.

Finally, Chapter 3 investigates the correlation between social interaction and labour market outcomes. Active group membership is used as the proxy of social interaction index. Various identification strategies provide the robust evidence that higher level of social interactions results in positive labour market participation. The positive effect of social interaction is most important among females. Moreover, three indices are produced to explore the social interactions of involving in different set of groups. It is shown that active group membership in professional organisation and sport club are most effectively correlated with labour market participation. Furthermore, evidences show that trust is positively correlated with wages. However, the effect of social interaction on wages is more pronounced among females. With respect to the differences in occupation types, social interaction shows no significant effect on wages.

On the whole, this thesis provides systematic insight into the nexus between social capital and economic activity in terms of the aforementioned issues. Although it mentions some questions that cannot be addressed within the scope of this thesis and which are fruitful avenues to pursuit, it illustrates a great understanding of the correlation between economic and social characteristics.

Chapter 4

Appendix A to chapter 1

A1 Proof of Lemma 1.1

We are looking for solutions satisfying $k_{t+1} = k_t = k$ and $m_{t+1} = m_t = m$. Applying the steady state condition in (23) yields,

$$k = \frac{\delta\theta(1 - q + qm)}{1 - \delta h}. \tag{A1.1}$$

Recall that from the expression in (19), we have $m_{t+1} = 0 \;\; \forall t$ whenever $m_t \leq \beta$. Together with (A1.1) this implies that the pair

$$m = 0 \text{ and } k = \frac{\delta\theta(1-q)}{1-\delta h},$$

is a steady state. Next, substitute (A1.1) in the part of (20) that applies for $m_t > \beta$ and use the steady state condition to write

$$m = \frac{\left[1 + \frac{g\delta\theta(1-q+qm)}{1-\delta h}\right][1-(\beta/m)]}{1 - \beta + \frac{g\delta\theta(1-q+qm)}{1-\delta h}[1-(\beta/m)]}. \tag{A1.2}$$

Defining the composite parameter terms $\psi \equiv \delta h$ and $\varepsilon \equiv g\delta\theta$, the equation in (A1.2) can be manipulated algebraically to derive

$$(1-\psi)(1-\beta)m^2 = (1-\psi)(m-\beta) + \varepsilon(1-q+qm)(m-\beta)(1-m). \tag{A1.3}$$

The cubic expression in (A1.3) has three roots, only two of them being acceptable in the sense that they lie on the interval $(\beta, 1]$. These are $m^{***} = 1$ and

$$m^{**} = -\frac{(1-\psi)(1-\beta) + \varepsilon[1-q(1+\beta)]}{2q\varepsilon} + \frac{\sqrt{\{[(1-\psi)(1-\beta) + \varepsilon[1-q(1+\beta)]\}^2 + 4q\beta\varepsilon[1-\eta+(1-q)\varepsilon]}}{2q\varepsilon},$$

which are the solutions in Eq. (26) and (25) respectively. Using the solution in (25), it is straightforward to establish that $m^{**} > \beta \Leftrightarrow \beta(1-\psi) > 0$ (which holds given $0<\psi<1$ by virtue of Assumption 2) and

$m^{**}<1 \Leftrightarrow (1-\psi)(1-2\beta)+\varepsilon(1-\beta)>0$ (which holds given $\beta<1/2$ by virtue of Assumption 3). Thus, the pairs

$$m=m^{**} \text{ and } k=\frac{\delta\theta(1-q+qm^{**})}{1-\delta h},$$

and

$$m=1 \text{ and } k=\frac{\delta\theta}{1-\delta h},$$

are steady state equilibria. Finally, after verifying that $\frac{\partial k}{\partial m}>0$ from (A1.1), it follows that $k^{***}>k^{**}>k^{*}$.

A2 Proof of Lemma 1.2

Consider the solutions that satisfy $k_{t+1}=k_t=k$ and $m_{t+1}=m_t=m$. The Jacobian matrix associated with the system of difference equations in (23) and (20) is the following:

$$\begin{bmatrix} \mathrm{K}_k & \mathrm{K}_m \\ M_k & M_m \end{bmatrix}.$$

Note that $\mathrm{K}_k=\delta h \equiv \psi \in (0,1)$ and $\mathrm{K}_m=\delta\theta q$, whereas for $m_t \leq \beta$ it is $M_k=M_m=0$. Therefore, with the equilibrium pair $m^{*}=0$ and $k^{*}=\frac{\delta\theta(1-q)}{1-\psi}$, the trace and the determinant are respectively given by

$$TR=\psi\in(0,1) \text{ and } \mathrm{DET}=0. \qquad \text{(A2.1)}$$

Since $1+TR+DET=1+\psi>0$, $1-TR+DET=1-\psi>0$, $|TR|<2$ and $|DET|<1$, we conclude that the pair (k^{*},m^{*}) is a stable equilibrium. For $m_t>\beta$ it is

$$M_k=\left(\frac{1}{m}-1\right)\left(1-\frac{\beta}{m}\right)\frac{\beta g}{\{1-\beta+gk[1-(\beta/m)]\}^2}, \qquad \text{(A2.2)}$$

and

$$M_m=\frac{\beta}{m}\frac{(1-\beta)(1+gk)}{\{1-\beta+gk[1-(\beta/m)]\}^2}. \qquad \text{(A2.3)}$$

Focusing on the equilibrium pair $m^{***}=1$ and $k^{***}=\frac{\delta\theta}{1-\psi}$, we can see that $M_k=0$ and

$$M_m=\frac{\beta(1-\beta)(1+gk)}{[1-\beta+gk(1-\beta)]^2}=\frac{\beta}{(1-\beta)(1+gk)}\equiv\zeta, \qquad \text{(A2.4)}$$

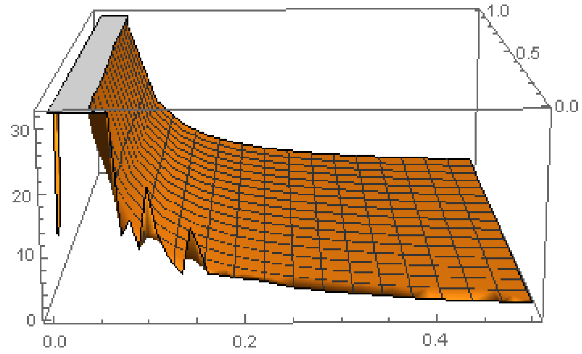
where the composite term ζ satisfies $\zeta\in(0,1)$ by virtue of $\beta<1/2$. Therefore,

$$TR=\psi+\zeta \text{ and } DET=\psi\zeta, \qquad \text{(A2.5)}$$

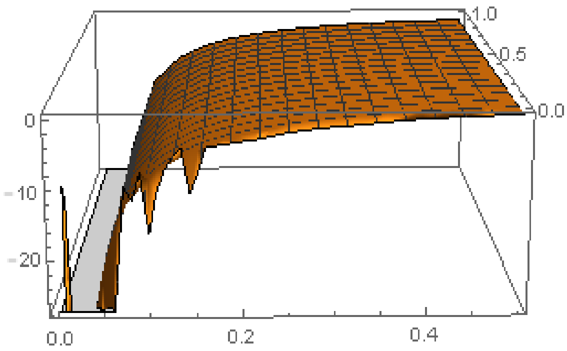
meaning that $1+TR+DET=(1+\psi)(1+\zeta)>0$, $1-TR+DET=(1-\psi)(1-\zeta)>0$, $|TR|<2$ and $|DET|<1$. Thus, the pair (k^{***},m^{***}) is also a stable equilibrium.

The complexity of the steady state solutions for m^{**} and k^{**}, together with the complex expressions in (A2.2) and (A2.3) impose an insurmountable difficulty in evaluating analytically the expressions for $1+TR+DET$ and $1-TR+DET$. For this reason, we shall evaluate these expressions by means of numerical examples. Doing so, we shall allow β and q to range freely within their permissible values and set a baseline parameter configuration for the remaining parameters, making sure that the conditions in Assumptions 1.1-1.3 hold. Subsequently, we shall deviate from the baseline case by choosing (in turns) different values for some of these parameters.

The baseline scenario sets $\delta=0.5$, $g=0.4$, $\eta=0.6$, $H=10$, $\lambda=0.5$ and $\theta=1$. Given these, below we plot $1+TR+DET$ and $1-TR+DET$ against $\beta\in[0,1/2]$ and $q\in[0,1]$ using three-dimensional diagrams. As we can see from the plots, $1+TR+DET>0$ and $1-TR+DET<0$ meaning the pair (k^{**},m^{**}) is a saddle point.



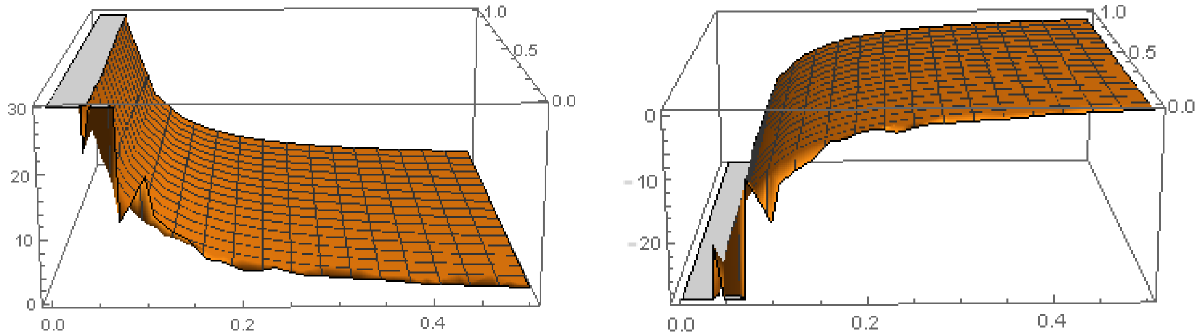
$1+TR+DET$



$1-TR+DET$

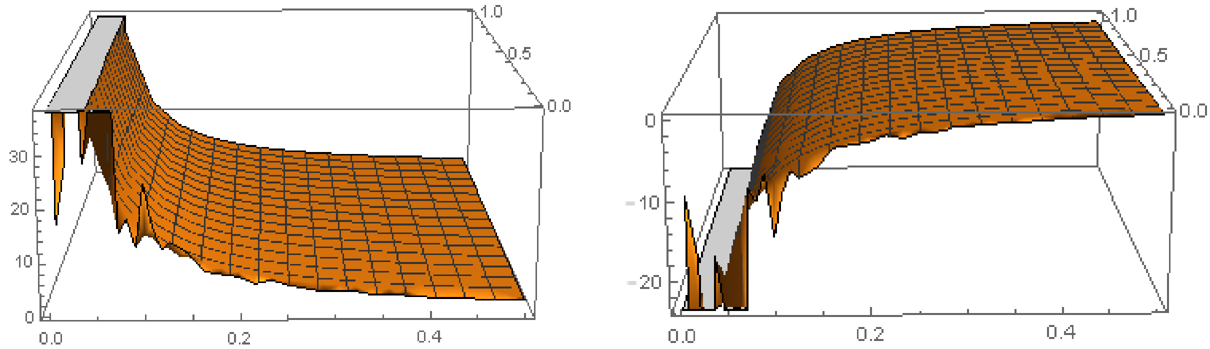
Figure A1. Baseline case

As we can see from the Figures below (A2 to A9), the result that the pair (k^{**}, m^{**}) is not a stable equilibrium survives under a wide range of parameter values deviating from the baseline case. We do this in turns, considering different parameter values for H, g, δ, and θ. The resulting plots verifying that $1+TR+DET>0$ and $1-TR+DET<0$ in all cases.



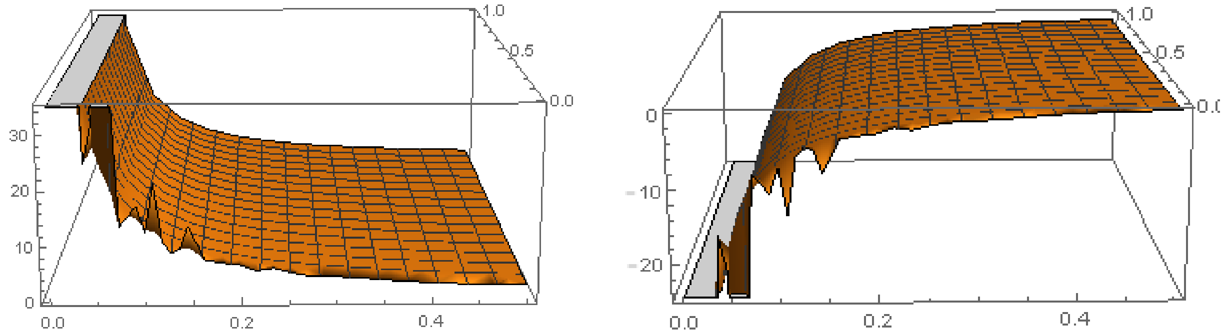
$1+TR+DET$ $1-TR+DET$

Figure A2. $H=3$



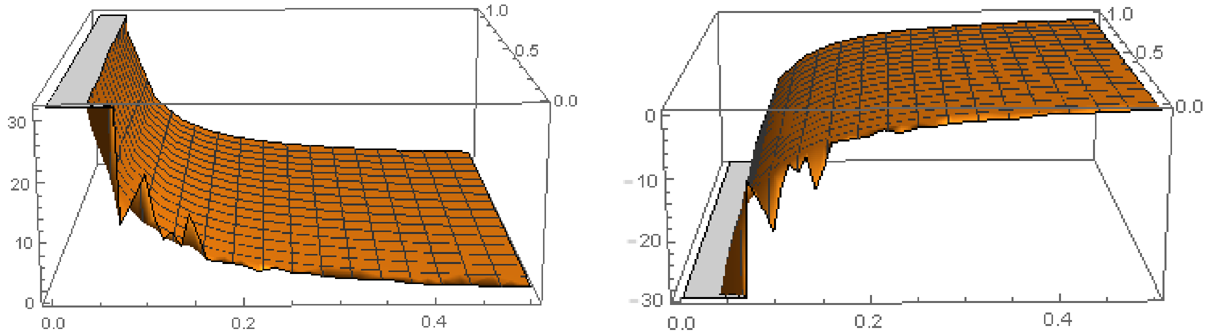
$1+TR+DET$ $1-TR+DET$

Figure A3. $H=80$



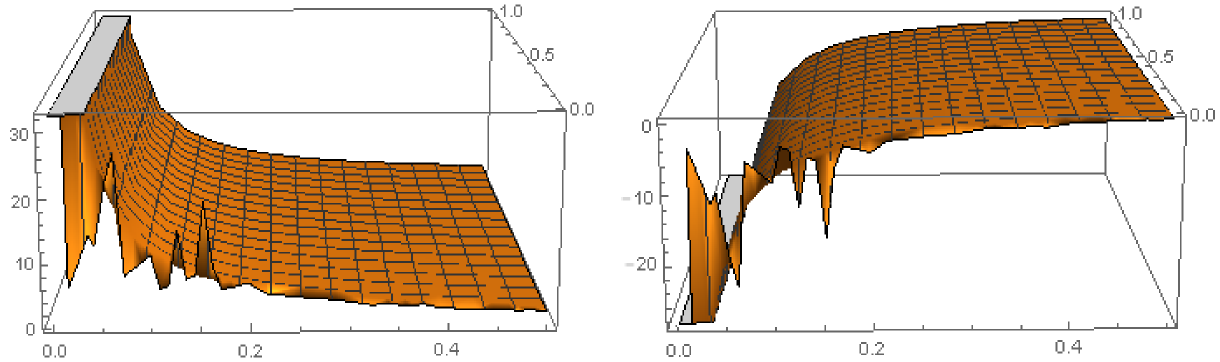
$1+TR+DET$ $1-TR+DET$

Figure A4. $g = 0.1$



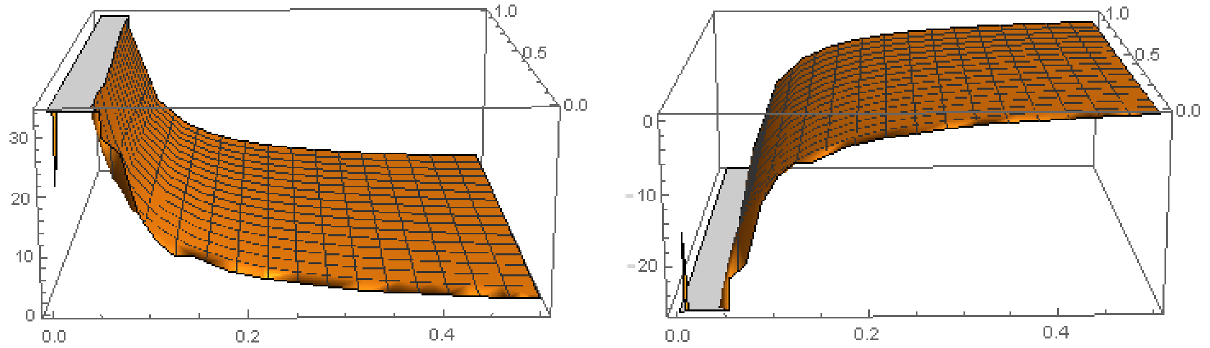
$1+TR+DET$ $1-TR+DET$

Figure A5. $g = 0.55$



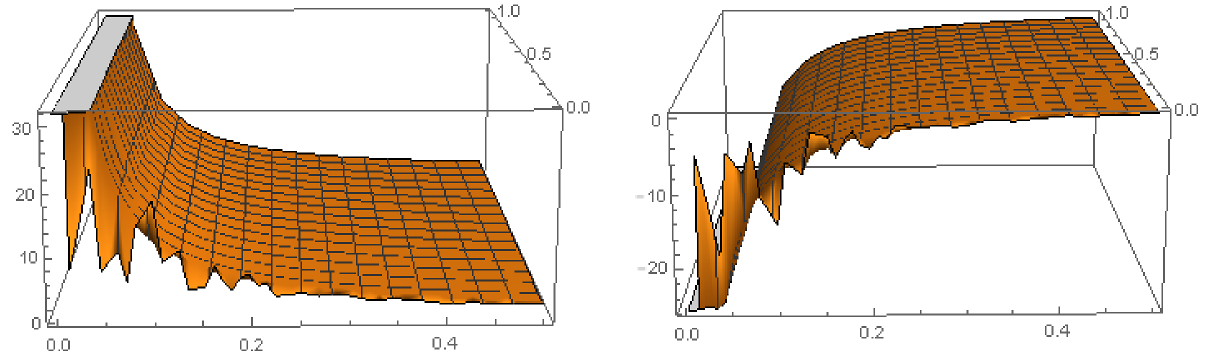
$1+TR+DET$ $1-TR+DET$

Figure A6. $\delta = 0.2$



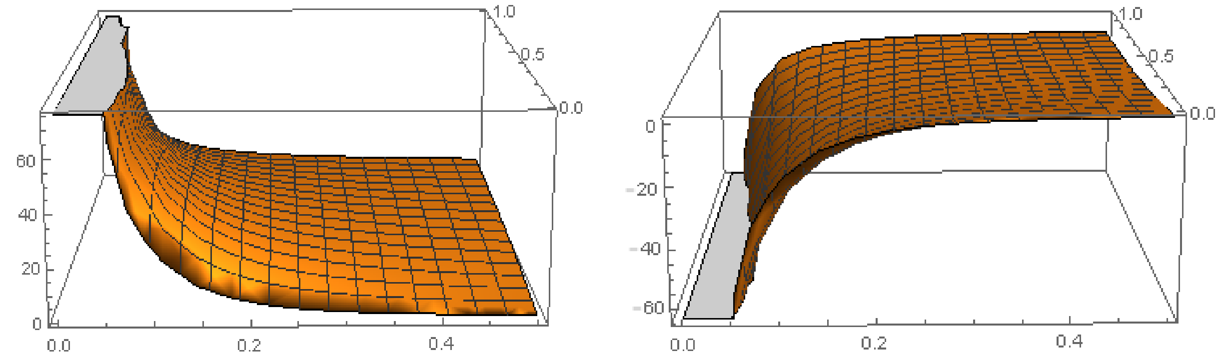
$1+TR+DET$ $1-TR+DET$

Figure A7. $\delta = 0.8$



$1+TR+DET$ $\quad$ $1-TR+DET$

Figure A8. $\theta = 0.5$



$1+TR+DET$ $\quad$ $1-TR+DET$

Figure A9. $\theta = 20$

Appendix B to chapter 2

Appendix B. 1. Summary of the components for trust index

Variable	Obs	Mean	Std. Dev	Min	Max
Bureaucracy quality	3226	2.1322	1.2015	0	4
Law and order	3226	3.6556	1.5052	0	6
Corruption	3226	3.0498	1.3788	0	6
Investment profile	3226	7.0856	2.5294	0	12
Ethnic tensions	3226	3.9411	1.4719	0	6
Religious tensions	3226	4.5717	1.3630	0	6
Internal conflict	3226	8.7349	2.6904	0	12
Socioeconomic conditions	3226	5.6786	2.2441	0	11
School enrolment	2538	71.1580	31.7898	0	160.619

Appendix B. 2. List of average Trust Index ranking and Trust Survey ranking

Country	Trust Index ranking	Country	Trust Survey ranking
Finland	1	Norway	1
Netherlands	2	Sweden	2
Luxembourg	3	Denmark	3
Denmark	4	Finland	4
Sweden	5	China	5
Norway	6	Saudi Arabia	6
Switzerland	7	Netherlands	7
Australia	8	New Zealand	8
Iceland	9	Viet Nam	9
New Zealand	10	Switzerland	10
Austria	11	Indonesia	11
Canada	12	Canada	12
United States	13	Iraq	13
Japan	14	Australia	14
Germany	15	Japan	15
United Kingdom	16	Iceland	16
Ireland	17	Ireland	17
Belgium	18	Thailand	18
Brunei	19	Northern Ireland	19
France	20	United States	20
Portugal	21	Hong Kong	21

Hong Kong SAR China	22	Great Britain	22
Czech Republic	23	India	23
Hungary	24	Germany	24
Slovenia	25	Iran	25
Italy	26	Austria	26
Spain	27	Spain	27
Slovak Republic	28	Republic of Korea	28
Korea	29	Belgium	29
Cyprus	30	Italy	30
Malta	31	Germany West	31
Croatia	32	Taiwan	32
The Bahamas	33	Ukraine	33
Estonia	34	Jordan	34
Latvia	35	Belarus	35
Greece	36	South Korea	36
Poland	37	Egypt	37
Lithuania	38	Pakistan	38
Chile	39	Serbia and Montenegro	39
Namibia	40	Russian Federation	40
Botswana	41	Bulgaria	41
Bulgaria	42	Hungary	42
Saudi Arabia	43	Czech Republic	43
Oman	44	Dominican Republic	44
Kazakhstan	45	Luxembourg	45
Malaysia	46	Lithuania	46
Costa Rica	47	Mexico	47
Bahrain	48	Albania	48
Qatar	49	Uruguay	49
Kuwait	50	Armenia	50
China	51	Ethiopia	51
Argentina	52	Estonia	52
Cuba	53	Greece	53
Israel	54	Israel	54
Thailand	55	Poland	55
Tunisia	56	Bangladesh	56
Mongolia	57	Nigeria	57
Azerbaijan	58	France	58
Mexico	59	Bosnia and Herzegovina	59
Uruguay	60	Croatia	60
Belarus	61	Malta	61
Brazil	62	Slovakia	62
Moldova	63	Latvia	63
Romania	64	Azerbaijan	64
Côte d′ivoire	65	Chile	65
Morocco	66	Andorra	66
Ukraine	67	Morocco	67

South Africa	68
Jordan	69
Trinidad and Tobago	70
Bolivia	71
Albania	72
Libya	73
United Arab Emirates	74
Syrian Arab Republic	75
Jamaica	76
Vietnam	77
Ecuador	78
Dominican Republic	79
Iran	80
Gabon	81
Russia	82
Lebanon	83
Venezuela	84
The Gambia	85
Turkey	86
Armenia	87
Egypt	88
Papua New Guinea	89
India	90
Panama	91
Madagascar	92
Paraguay	93
Ghana	94
Colombia	95
Burkina Faso	96
Zimbabwe	97
El Salvador	98
Philippines	99
Nicaragua	100
Kenya	101
Malawi	102
Senegal	103
Peru	104
Tanzania	105
Guyana	106
Algeria	107
Suriname	108
Sierra Leone	109
Congo	110
Guatemala	111
Cameroon	112
Yemen	113

Argentina	68
South Africa	69
Georgia	70
Republic of Moldova	71
Slovenia	72
Moldova	73
Mali	74
Singapore	75
Romania	76
Kyrgyzstan	77
Portugal	78
Guatemala	79
Serbia	80
Venezuela	81
Burkina Faso	82
El Salvador	83
Puerto Rico	84
Colombia	85
Zimbabwe	86
Zambia	87
Turkey	88
Algeria	89
Macedonia, Republic of	90
Cyprus	91
Malaysia	92
Ghana	93
Tanzania, United Republic Of	94
Uganda	95
Peru	96
Philippines	97
Brazil	98
Rwanda	99
Trinidad and Tobago	100

Indonesia	114	
Mozambique	115	
Guinea	116	
Honduras	117	
Zambia	118	
Togo	119	
Mali	120	
Uganda	121	
Ethiopia	122	
Niger	123	
Guinea-Bissau	124	
Pakistan	125	
Angola	126	
Myanmar	127	
Sri Lanka	128	
Sudan	129	
Bangladesh	130	
Nigeria	131	
Somalia	132	
Liberia	133	
Iraq	134	
Haiti	135	
Dem. Rep. Congo	136	

Appendix B. 3. Comparison of average Trust Index ranking and Trust Survey ranking

Country	Trust index ranking	Trust survey ranking
Finland	1	4
Netherlands	2	7
Luxembourg	3	40
Denmark	4	3
Sweden	5	2
Norway	6	1
Switzerland	7	10
Australia	8	14
Iceland	9	16
New Zealand	10	8
Austria	11	25
Canada	12	12
United States	13	19
Japan	14	15
Germany	15	23
United Kingdom	16	21
Ireland	17	17
Belgium	18	27

France	19	53
Portugal	20	67
Hong Kong SAR China	21	20
Czech Republic	22	38
Hungary	23	37
Slovenia	24	63
Italy	25	28
Spain	26	26
Slovak Republic	27	56
Korea	28	32
Cyprus	29	77
Malta	30	55
Croatia	31	54
Estonia	32	47
Latvia	33	57
Greece	34	48
Poland	35	50
Lithuania	36	41
Chile	37	59
Bulgaria	38	36
Saudi Arabia	39	6
Malaysia	40	78
China	41	5
Argentina	42	61
Israel	43	49
Thailand	44	18
Azerbaijan	45	58
Mexico	46	42
Uruguay	47	44
Belarus	48	31
Brazil	49	84
Moldova	50	64
Romania	51	66
Morocco	52	60
Ukraine	53	29
South Africa	54	62
Jordan	55	30
Trinidad and Tobago	56	85
Albania	57	43
Vietnam	58	9
Dominican Republic	59	39
Iran	60	24
Russia	61	35
Venezuela	62	69
Turkey	63	75
Armenia	64	45

Egypt	65	33
India	66	22
Ghana	67	79
Colombia	68	72
Burkina Faso	69	70
Zimbabwe	70	73
El Salvador	71	71
Philippines	72	83
Peru	73	82
Tanzania	74	80
Algeria	75	76
Guatemala	76	68
Indonesia	77	11
Zambia	78	74
Mali	79	65
Uganda	80	81
Ethiopia	81	46
Pakistan	82	34
Bangladesh	83	51
Nigeria	84	52
Iraq	85	13

Appendix B. 4. Sample statistic

Variable	Full sample (139) Obs	Mean	Std. Dev.	OECD Countries (31) Obs	Mean	Std. Dev.	Non-OECD Countries (108) Obs	Mean	Std. Dev.
trust index(a)	2,383	1.18E-09	0.9582 0.8822(be) 0.3709(wi)	-	-	-	-	-	-
trust index(b)	2,823	-6.50E-10	0.9569 0.8873(be) 0.3593(wi)	877	0.9765	0.6015 0.5499(be) 0.2496(wi)	1,946	-0.4401	0.736 0.6477 0.3990
L1.trust index(b)	2,820	0.0006	0.9570 0.8879(be) 0.3593(wi)	877	0.9765	0.6015 0.5499(be) 0.2496(wi)	1,943	-0.4398	0.7362 0.6482(be) 0.3992(wi)
L2.trust index(b)	2,787	0.0064	0.9591 0.8875(be) 0.3598(wi)	877	0.9765	0.6015 0.5499(be) 0.2496(wi)	1,910	-0.439	0.7386 0.6491(be) 0.4005(wi)
L3.trust index(b)	2,692	0.0049	0.9625 0.8894(be) 0.3636(wi)	844	0.9807	0.6035 0.5511(be) 0.2513(wi)	1,848	-0.4408	0.7413 0.6505(be) 0.4048(wi)
lfdi	3,436	0.4566	1.5986	869	0.525	1.3519	2,567	0.4334	1.6734
lgini	938	3.6677	0.2664	252	3.4872	0.2204	686	3.734	0.2507
income	3,133	9.0981	1.265	803	10.2643	0.4569	2,330	8.6962	1.2039
education	2,978	72.9668	31.3267	927	99.0027	15.4272	2,051	61.1992	29.5389
trade rate	3,778	79.1374	51.801	965	79.9813	46.8815	2,813	78.8479	53.3891
inflation rate	3,893	53.5259	587.2015	965	8.2336	36.0034	2,928	68.4532	676.1347
government cost	3,881	15.9548	6.2429	996	18.74	4.3814	2,885	14.9932	6.4967
growth rate	3,900	3.5149	6.1937	965	2.7697	3.5027	2,935	3.7599	6.8341

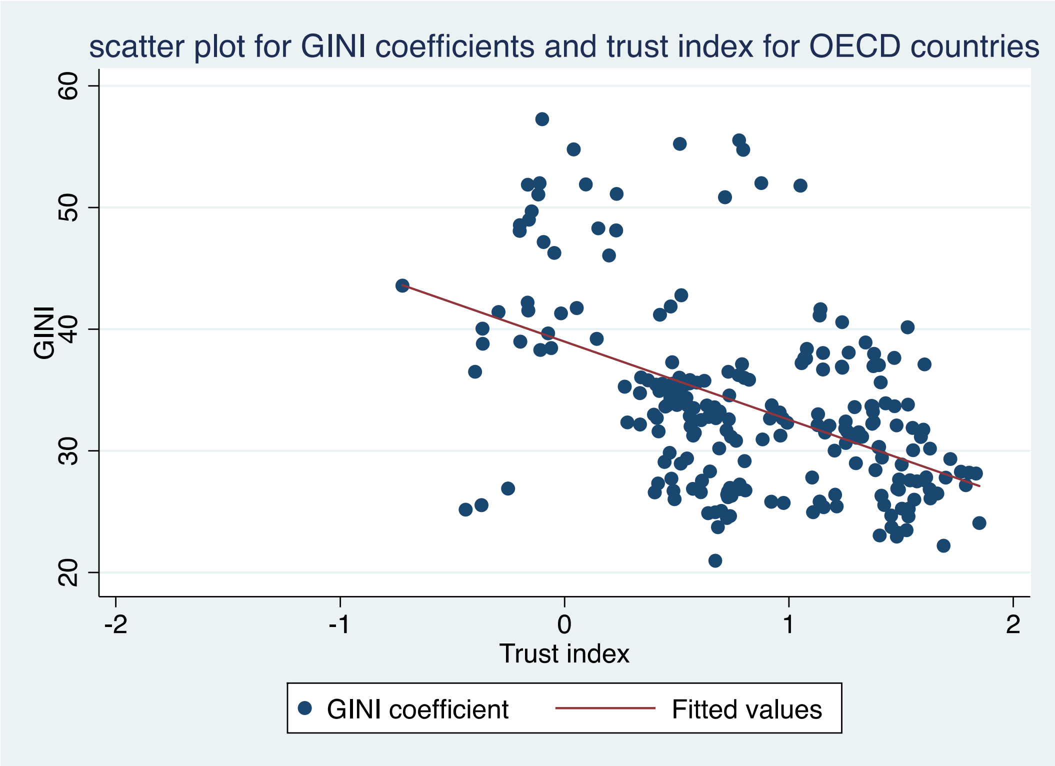
Notes: Trust index(a) is the one used in section 2.2.3 and section 2.3. It captures the trust level of each country by considering the dataset of time period from 1984 to 2008. Trust index(b) is the one used in section 2.4 which is built by using the dataset with time period from 1984 to 2014. Income reported as logarithm of GDP per capita. Education reported as school enrolment, secondary (% gross); Trade rate reported as trade (% of GDP); Inflation rate reported as GDP deflator (annual %); Government cost reported as the general government final consumption expenditure (% of GDP); Growth rate reported as GDP growth (annual %).

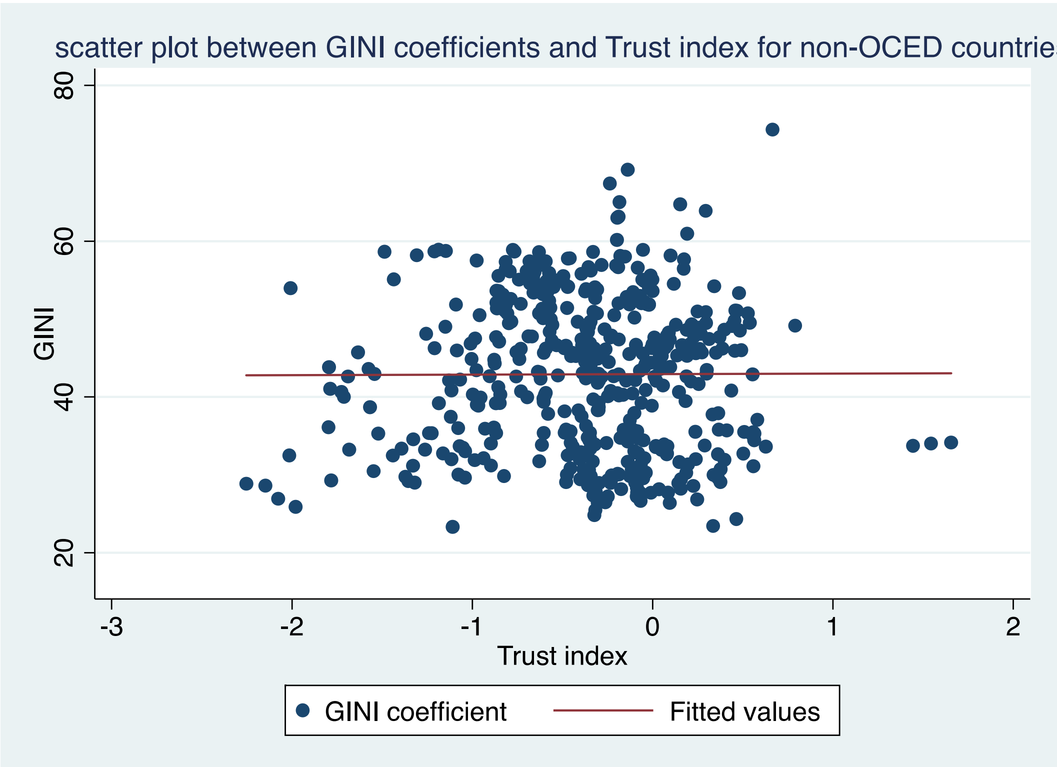
Appendix B. 5. Hausman test

	---- Coefficients ----			
	(b) fe	(B) re	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
Trust index(t-1)	0.6650	0.3693	0.2957	0.0313
Education	0.0197	0.0111	0.0086	0.0014
Trade rate	0.0227	0.0168	0.0059	0.0011
Annual growth rate	0.0445	0.0449	-0.0004	0.0008

b= consistent under H_0 and H_a; obtained from xtreg
B= inconsistent under H_a, efficient under H_0; obtained from xtreg
Test: H_0: difference in coefficients not systematic
Chi2(4) = (b-B)′[(V_b-V_B)^(-1)](b-B)
= 197.54
Prob>chi2 = 0.0000

Appendix B. 6.


scatter plot for GINI coefficients and trust index for OECD countries
GINI
20
30
40
50
60
-2
-1
0
1
2
Trust index
GINI coefficient
Fitted values


scatter plot between GINI coefficients and Trust index for non-OCED countrie
GINI
20
40
60
80
-3
-2
-1
0
1
2
Trust index
GINI coefficient
Fitted values

Appendix B. 7. Hausman test

	---- Coefficients ----			
	(b) fe	(B) re	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
Trust index(t-1)	0.0217	0.0042	0.0175	0.0049
Education	0.0003	8.27e-06	0.0002	0.0001
Income	-0.0476	-0.0572	0.0096	0.0135
Trade rate	0.0002	0.0001	0.0001	0.0001
Inflation rate	-0.00003	-0.00004	-4.54e-07	0.00001
Government consumption	0.0014	0.0001	0.0013	0.0011

b= consistent under H_0 and H_a; obtained from xtreg
B= inconsistent under H_a, efficient under H_0; obtained from xtreg
Test: H_0: difference in coefficients not systematic

Chi2(6) = (b-B)′[(V_b-V_B)^(-1)](b-B)
= 18.81
Prob>chi2 = 0.0045

Appendix C to chapter 3

Appendix C. 1. Sample statistics

	Full Sample	
	Mean	Std.Dev.
Employment		
Employed currently	0.934	0.248
Demographics		
Age	38.835	11.533
Dummy for female	0.385	0.487
Dummy for white	0.969	0.173
Education		
Higher degree	0.035	0.184
First degree	0.139	0.346
Other higher education	0.083	0.276
A-level	0.221	0.415
O-level	0.278	0.448
Cse	0.06	0.237
None of these qualification	0.185	0.388
Family structure		
Dummy for married	0.717	0.451
Dummy for anychild	0.349	0.477
Dummy for having health problems	0.045	0.208
Metropolitan area	percent	
London	7.36	
South England	40.67	
North England	16.14	
Wales	11.9	
Scotland	15.62	
North Ireland	8.31	

Appendix C. 1. Continued

	Sample mean	Std.Dev.	Employed group	Unemployed group
Active membership				
Political party	0.01	0.1	0.01	0.008
Trade union	0.054	0.226	0.057	0.007
Environmental group	0.017	0.128	0.017	0.013
Parents association	0.048	0.215	0.05	0.032
Tenants group	0.026	0.16	0.027	0.022
Religious group	0.083	0.276	0.084	0.064
Voluntary group	0.027	0.163	0.026	0.042
Pensioners organisation	0.001	0.034	0.001	0.001
Scout/guides organization	0.015	0.122	0.016	0.008
Professional orgnization	0.041	0.199	0.044	0.01
Other community group	0.015	0.123	0.016	0.012
Social group	0.091	0.288	0.092	0.075
Sport club	0.229	0.42	0.235	0.141
Women institute	0.004	0.063	0.004	0.003
Women group	0.004	0.067	0.005	0.003
Other organisation	0.047	0.211	0.048	0.032
social interaction index	0.691	0.913	0.708	0.464
pc1 index	0.078	0.204	0.079	0.056
pc2 index	0.056	0.268	0.058	0.03
pc3 index	0.231	0.36	0.237	0.136
Person-year observation			54,405	
Number of persons			13,071	

Appendix C. 2.

A. Correlation between social interaction and employment status at different age stage by pooled OLS regression model

	(1) age 18-24	(2) age 25-29	(3) age 30-34	(4) age 35-39	(5) age 40-44	(6) age 45-49	(7) age 50-54	(8) age 55-65
Social	0.030***	0.010**	0.009***	0.009***	0.012***	0.008***	0.013***	0.003
interaction	(0.006)	(0.004)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)
Higher	0.200***	0.223***	0.155***	0.107***	0.100***	0.060***	0.077***	0.067***
degree	(0.047)	(0.021)	(0.017)	(0.015)	(0.014)	(0.014)	(0.018)	(0.022)
1st degree	0.211***	0.216***	0.170***	0.112***	0.076***	0.054***	0.062***	0.049***
	(0.020)	(0.014)	(0.012)	(0.010)	(0.009)	(0.009)	(0.012)	(0.014)
Hnd, hnc,	0.235***	0.210***	0.166***	0.108***	0.071***	0.056***	0.038***	0.053***
teaching	(0.024)	(0.016)	(0.013)	(0.011)	(0.011)	(0.011)	(0.013)	(0.014)
A level	0.223***	0.207***	0.159***	0.112***	0.080***	0.046***	0.035***	0.060***
	(0.017)	(0.014)	(0.011)	(0.009)	(0.009)	(0.008)	(0.010)	(0.011)
A level	0.199***	0.194***	0.145***	0.095***	0.072***	0.049***	0.026***	0.052***
	(0.017)	(0.014)	(0.011)	(0.009)	(0.008)	(0.008)	(0.009)	(0.009)
Cse	0.159***	0.153***	0.119***	0.079***	0.083***	0.058***	0.066**	0.054
	(0.019)	(0.017)	(0.013)	(0.012)	(0.012)	(0.016)	(0.030)	(0.042)
Married	0.075***	0.061***	0.068***	0.033***	0.060***	0.055***	0.074***	0.072***
	(0.010)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.009)	(0.010)
Ethnic	0.174***	0.058***	0.023	0.016	0.076***	0.016	0.040*	0.015
	(0.026)	(0.017)	(0.014)	(0.014)	(0.015)	(0.016)	(0.024)	(0.024)
Anychild	-0.125***	-0.058***	-0.031***	-0.002	-0.006	-0.008	-0.022**	-0.010
	(0.017)	(0.008)	(0.006)	(0.006)	(0.006)	(0.006)	(0.010)	(0.017)
Female	0.024***	0.004	-0.004	0.014***	0.011**	0.006	0.002	0.015*
	(0.009)	(0.006)	(0.006)	(0.005)	(0.005)	(0.006)	(0.007)	(0.008)
Region	-0.001	0.002	0.003	-0.005***	-0.003*	-0.0001	0.002	-0.005**
	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Health	-0.080***	-0.113***	-0.081***	-0.087***	-0.038***	-0.078***	-0.080***	-0.100***
	(0.024)	(0.017)	(0.013)	(0.012)	(0.012)	(0.012)	(0.015)	(0.017)
Constant	0.479***	0.652***	0.737***	0.829***	0.768***	0.852***	0.801***	0.836***
	(0.030)	(0.021)	(0.018)	(0.017)	(0.018)	(0.018)	(0.025)	(0.026)
Sample Size	6014	6241	6735	6948	6608	6277	5207	5197
R-square	0.070	0.078	0.067	0.045	0.042	0.031	0.034	0.031

* p<0.10, ** p<0.05, *** p<0.01

Notes: The time period of the sample includes 1993-1995, 1997, 1999, 2001, 2003, 2005, and 2007. The dependent variable is employment status, which takes the value one if the individual is in paid full-time employment and zero otherwise. Social interaction is proxied by active group membership. Age represents the respondent's age. Higher degree, 1st degree, Hnc, A level, O level, Cse are all dummy variables which represents the six education levels. Married is a dummy variable which indicates one's marriage status. Ethnic is a dummy variable which takes the value one if the individual is white and zero otherwise. Anychild and Female are dummy variables, which stand for whether the respondent has any child or not and whether the respondent is female or not. Region represents the respondent's residence region, which takes values 1 (London), 2 (S England), 3 (N England), 4 (Wales), 5 (Scotland), 6 (N Ireland). Health is a dummy variable and represents the health status of the respondent. It takes the value one if the individual is currently experiencing anxiety and depression when answering the survey and zero otherwise.

B. Correlation between social interaction and employment status at different age stage in the fixed effects regression model

	(1) age 18-24	(2) age 25-29	(3) age 30-34	(4) age 35-39	(5) age 40-44	(6) age 45-49	(7) age 50-54	(8) age 55-65
Social interaction	-0.002	-0.007	0.002	-0.002	0.005	-0.002	0.007	-0.007*
	(0.009)	(0.006)	(0.004)	(0.003)	(0.004)	(0.003)	(0.005)	(0.004)
Higher degree	0.112	-0.031	-0.056	0.006	0.311***	-0.006	-0.038	0.008
	(0.204)	(0.170)	(0.105)	(0.086)	(0.102)	(0.083)	(0.141)	(0.121)
1st degree	0.101	-0.246	-0.079	-0.001	0.298***	0.008	-0.034	-0.048
	(0.126)	(0.160)	(0.098)	(0.072)	(0.082)	(0.078)	(0.087)	(0.154)
Hnd, hnc, teaching	0.149	-0.248	0.037	-0.003	0.302***	-0.005	-0.029	-0.065
	(0.118)	(0.160)	(0.090)	(0.079)	(0.088)	(0.078)	(0.091)	(0.125)
A level	0.127	-0.318**	-0.010	-0.002	0.370***	0.023	-0.037	-0.081
	(0.114)	(0.145)	(0.082)	(0.068)	(0.067)	(0.060)	(0.071)	(0.055)
O level	0.085	-0.282*	-0.009	-0.001	0.292***	-0.021	-0.077	0.021
	(0.117)	(0.155)	(0.080)	(0.066)	(0.065)	(0.052)	(0.072)	(0.064)
Cse	-0.021	-0.146	-0.004	-3.52e-06	0.298**	-0.029		
	(0.141)	(0.185)	(0.110)	(0.099)	(0.150)	(0.199)		
Married	0.056***	-0.008	-0.023*	-0.033***	-0.011	0.026	0.014	-0.010
	(0.015)	(0.012)	(0.013)	(0.013)	(0.017)	(0.017)	(0.024)	(0.023)
Anychild	-0.031	0.030**	-0.011	-0.007	-0.008	-0.017*	-0.029*	0.020
	(0.027)	(0.015)	(0.012)	(0.012)	(0.011)	(0.010)	(0.016)	(0.021)
Region	-0.077***	0.003	-0.0004	0.011	0.012	-0.019	0.001	-0.193***
	(0.026)	(0.015)	(0.018)	(0.017)	(0.023)	(0.023)	(0.038)	(0.025)
Health	-0.049	-0.046**	0.012	-0.041***	0.016	-0.036***	-0.015	-0.013
	(0.031)	(0.022)	(0.016)	(0.014)	(0.016)	(0.014)	(0.018)	(0.017)
Constant	1.004***	1.170***	0.985***	0.949***	0.660***	0.999***	0.954***	1.563***
	(0.129)	(0.146)	(0.092)	(0.080)	(0.090)	(0.082)	(0.127)	(0.090)
Sample Size	6347	6519	6921	7073	6696	6329	5249	5241
Population size	3033	3547	3709	3767	3563	3271	2740	2174
R-square	0.011	0.042	0.010	0.002	0.027	0.002	0.0001	0.0001

* p<0.10, ** p<0.05, *** p<0.01

Notes: The time period of the sample includes 1993-1995, 1997, 1999, 2001, 2003, 2005, and 2007. The dependent variable is employment status, which takes the value one if the individual is in paid full-time employment and zero otherwise. Social interaction is proxied by active group membership. Age represents the respondent's age. Higher degree, 1st degree, Hnc, A level, O level, Cse are all dummy variables which represents the six education levels. Married is a dummy variable which indicates one's marriage status. Ethnic is a dummy variable which takes the value one if the individual is white and zero otherwise. Anychild and Female are dummy variables, which stand for whether the respondent has any child or not and whether the respondent is female or not. Region represents the respondent's residence region, which takes values 1 (London), 2 (S England), 3 (N England), 4 (Wales), 5 (Scotland), 6 (N Ireland). Health is a dummy variable and represents the health status of the respondent. It takes the value one if the individual is currently experiencing anxiety and depression when answering the survey and zero otherwise.

C. Correlation between social interaction and employment status at different age stage in the Fixed effects iv regression model

	(1) age 18-24	(2) age 25-29	(3) age 30-34	(4) age 35-39	(5) age 40-44	(6) age 45-49	(7) age 50-54	(8) age 55-65
Social interaction	1.389***	0.790***	0.240***	0.117***	0.202***	0.234***	0.248***	0.326***
	(0.309)	(0.249)	(0.054)	(0.026)	(0.037)	(0.045)	(0.040)	(0.084)
Higher degree	-0.411	-0.096	-0.018	0.036	0.379***	0.072	-0.114	-0.103
	(0.607)	(0.483)	(0.149)	(0.103)	(0.139)	(0.137)	(0.206)	(0.228)
1st degree	0.145	-0.404	-0.044	0.021	0.274**	0.079	0.021	0.359
	(0.368)	(0.458)	(0.138)	(0.085)	(0.111)	(0.129)	(0.126)	(0.306)
Hnd, hnc, teaching	0.225	-0.081	0.021	0.034	0.285**	0.005	-0.007	0.100
	(0.345)	(0.458)	(0.127)	(0.094)	(0.119)	(0.128)	(0.132)	(0.237)
A level	0.143	-0.338	0.031	0.039	0.380***	0.196*	0.024	-0.042
	(0.334)	(0.411)	(0.116)	(0.081)	(0.091)	(0.104)	(0.103)	(0.104)
O level	0.184	-0.278	0.032	0.015	0.328***	0.048	-0.123	-0.039
	(0.342)	(0.442)	(0.114)	(0.079)	(0.089)	(0.086)	(0.105)	(0.121)
Cse	0.360	-0.551	0.095	-0.009	0.274	0.026		
	(0.421)	(0.542)	(0.157)	(0.118)	(0.203)	(0.326)		
Married	0.055	0.050	-0.028	-0.022	0.007	0.051*	-0.032	0.020
	(0.045)	(0.039)	(0.018)	(0.015)	(0.024)	(0.028)	(0.036)	(0.044)
Anychild	-0.006	-0.003	0.014	-0.004	-0.017	-0.029*	-0.072***	0.004
	(0.079)	(0.044)	(0.017)	(0.014)	(0.015)	(0.016)	(0.024)	(0.040)
Region	-0.204**	-0.036	-0.005	0.018	-0.010	0.025	-0.035	-0.177***
	(0.080)	(0.044)	(0.025)	(0.021)	(0.031)	(0.039)	(0.056)	(0.047)
Health	-0.139	0.015	0.036	-0.043***	0.024	-0.052**	-0.011	0.027
	(0.093)	(0.065)	(0.023)	(0.017)	(0.022)	(0.023)	(0.026)	(0.033)
Constant	0.611	0.847**	0.802***	0.812***	0.561***	0.592***	0.917***	1.201***
	(0.388)	(0.427)	(0.137)	(0.100)	(0.123)	(0.155)	(0.185)	(0.191)
Sample size	6347	6519	6921	7073	6696	6329	5249	5241
Population size	3033	3547	3709	3767	3563	3271	2740	2174
R-square	0.013	0.003	0.002	0.007	0.025	0.010	0.003	0.003

* p<0.10, ** p<0.05, *** p<0.01

Notes: The time period of the sample includes 1993-1995, 1997, 1999, 2001, 2003, 2005, and 2007. The dependent variable is employment status, which takes the value one if the individual is in paid full-time employment and zero otherwise. Social interaction is proxied by active group membership. Age represents the respondent's age. Higher degree, 1st degree, Hnc, A level, O level, Cse are all dummy variables which represents the six education levels. Married is a dummy variable which indicates one's marriage status. Ethnic is a dummy variable which takes the value one if the individual is white and zero otherwise. Anychild and Female are dummy variables, which stand for whether the respondent has any child or not and whether the respondent is female or not. Region represents the respondent's residence region, which takes values 1 (London), 2 (S England), 3 (N England), 4 (Wales), 5 (Scotland), 6 (N Ireland). Health is a dummy variable and represents the health status of the respondent. It takes the value one if the individual is currently experiencing anxiety and depression when answering the survey and zero otherwise.

Appendix C. 3. First stage regression results for some fixed effects IV regression model

A

Norga	(1) Coef.	(2) Coef.	(3) Coef.
Meannorga	0.488***	0.477***	0.495
	(0.020)	(0.034)	(0.025)
Age	0.004	0.002	0.005
	(0.004)	(0.007)	(0.005)
Age2	-0.00007	-0.00004	-0.0001
	(0.00005)	(0.0001)	(0.0001)
Higher degree	0.117	0.207	0.054
	(0.091)	(0.142)	(0.12)
1st degree	0.083	0.169	0.009
	(0.074)	(0.111)	(0.099)
Hnd, hnc, teaching	-0.025	0.088	-0.121
	(0.078)	(0.118)	(0.105)
A level	-0.066	-0.033	-0.09
	(0.065)	(0.101)	(0.086)
O level	0.041	0.087	0.014
	(0.065)	(0.099)	(0.088)
Cse	-0.0004	-0.148	0.079
	(0.109)	(0.178)	(0.139)
Married	-0.064***	-0.031	-0.085
	(0.015)	(0.022)	(0.02)
Anychild	0.0612***	0.101***	0.048
	(0.013)	(0.022)	(0.016)
Region	0.017	-0.002	0.03
	(0.019)	(0.03)	(0.024)
Health	-0.011	-0.025	0.005
	(0.021)	(0.029)	(0.031)
Constant	0.258**	0.264	0.259
	(0.111)	(0.187)	(0.139)
Obs	50375	19602	30773
Population size	12520	5614	6906
R-square	0.07	0.09	0.04
F test	58.07	20.96	38.38
Prob>F	0.000	0.000	0.000
Regression	Table 3.1.B (3)	Table 3.2 (5)	Table 3.2 (6)

* p<0.10, ** p<0.05, *** p<0.01

B.

norga	(1) Coef.	(2) Coef.	(3) Coef.	(4) Coef.	(5) Coef.	(6) Coef.	(7) Coef.	(8) Coef.
meannorga	0.260***	0.216***	0.429***	0.590***	0.590***	0.506***	0.680***	0.341***
	(0.054)	(0.063)	(0.068)	(0.069)	(0.075)	(0.076)	(0.082)	(0.073)
Higher degree	0.421	0.157	-0.263	-0.224	-0.247	-0.189	0.445	0.402
	(0.401)	(0.566)	(0.437)	(0.460)	(0.469)	(0.453)	(0.612)	(0.572)
1st degree	0.006	0.283	-0.235	-0.155	0.241	-0.216	-0.155	-1.121
	(0.248)	(0.534)	(0.406)	(0.382)	(0.376)	(0.426)	(0.375)	(0.728)
Hnd, hnc, teaching	-0.022	-0.137	-0.034	-0.380	0.249	-0.033	-0.077	-0.443
	(0.232)	(0.534)	(0.374)	(0.420)	(0.404)	(0.426)	(0.393)	(0.591)
A level	0.019	0.110	-0.276	-0.367	-0.041	-0.697**	-0.205	-0.082
	(0.225)	(0.482)	(0.341)	(0.363)	(0.310)	(0.328)	(0.306)	(0.262)
O level	-0.037	0.086	-0.297	-0.194	-0.135	-0.252	0.241	0.199
	(0.230)	(0.518)	(0.333)	(0.353)	(0.301)	(0.285)	(0.314)	(0.302)
Cse	-0.239	0.615	-0.493	0.008	0.208	-0.287		
	(0.278)	(0.619)	(0.457)	(0.528)	(0.689)	(1.085)		
Married	0.002	-0.070*	0.022	-0.111	-0.095	-0.102	0.200*	-0.087
	(0.030)	(0.041)	(0.053)	(0.069)	(0.080)	(0.092)	(0.104)	(0.110)
Anychild	-0.011	0.046	-0.094**	-0.0001	0.022	0.032	0.146**	0.020
	(0.053)	(0.050)	(0.048)	(0.062)	(0.050)	(0.052)	(0.070)	(0.100)
Region	0.104	0.046	0.007	-0.057	0.134	-0.211*	0.168	-0.024
	(0.050)	(0.050)	(0.073)	(0.092)	(0.105)	(0.126)	(0.165)	(0.119)
Health	0.071	-0.068	-0.107	0.030	-0.051	0.068	-0.022	-0.118
	(0.061)	(0.073)	(0.066)	(0.075)	(0.074)	(0.075)	(0.076)	(0.080)
Constant	0.043	0.176	0.579	0.771	-0.028	1.409**	-0.433	0.748*
	(0.259)	(0.491)	(0.383)	(0.430)	(0.420)	(0.450)	(0.556)	(0.431)
Obs	6347	6519	6921	7073	6696	6329	5249	5241
Population size	3033	3547	3709	3767	3563	3271	2740	2174
R-square	0.010	0.004	0.015	0.014	0.015	0.005	0.014	0.009
F test	2.890	2.110	4.520	7.190	6.200	5.080	8.520	3.090
Prob>F	0.000	0.017	0.000	0.000	0.000	0.000	0.000	0.001
Regression	Table 3.3.C (1)	Table 3.3.C (2)	Table3. 3.C (3)	Table3.3 .C (4)	Table3.3 .C (5)	Table3.3 .C (6)	Table3.3 .C (7)	Table3.3. C (8)

* p<0.10, ** p<0.05, *** p<0.01

C.

Pc1	(1) Coef.	Pc2	(2) Coef.	Pc3	(3) Coef.
Meanpc1	0.484***	Meanpc2	0.586***	Meanpc3	0.593***
	(0.020)		(0.023)		(0.024)
Age	0.004***	Age	-0.002*	Age	-0.002
	(0.001)		(0.001)		(0.002)
Age2	-0.00005***	Age2	0.00002	Age2	-2.75E-06
	(0.00001)		(0.00001)		(0.00002)
Higher degree	0.032	Higher degree	0.078***	Higher degree	0.084**
	(0.020)		(0.027)		(0.037)
1st degree	0.011	1st degree	0.068***	1st degree	0.036
	(0.016)		(0.022)		(0.030)
Hnd, hnc, teaching	0.012	Hnd, hnc, teaching	0.016	Hnd, hnc, teaching	-0.025
	(0.017)		(0.023)		(0.032)
A level	-0.010	A level	0.048**	A level	-0.026
	(0.014)		(0.019)		(0.027)
O level	0.004	O level	0.047**	O level	0.016
	(0.014)		(0.019)		(0.027)
Cse	0.007	Cse	0.089***	Cse	-0.020
	(0.024)		(0.033)		(0.045)
Married	-0.003	Married	-0.008*	Married	-0.029***
	(0.003)		(0.004)		(0.006)
Anychild	0.024***	Anychild	-0.033***	Anychild	-0.010*
	(0.003)		(0.004)		(0.005)
Region	0.004	Region	-0.0004	Region	0.005
	(0.004)		(0.006)		(0.008)
Health	0.0005	Health	-0.007	Health	-0.002
	(0.005)		(0.006)		(0.009)
Constant	-0.052**	Constant	0.057*	Constant	0.178***
	(0.024)		(0.033)		(0.045)
Obs	50375		50375		50375
Population size	12520		12520		12520
R-square	0.1		0.03		0.05
F test	59.53		63.78		59.01
Prob>F	0.000		0.000		0.000
Regression	Table 3.4.A (7)		Table 3.4.A (8)		Table 3.4.A (9)

* p<0.10, ** p<0.05, *** p<0.01

D.

Norga	(1) Coef.	(2) Coef.	(3) Coef.
Meannorga	0.499***	0.457***	0.526***
	(0.024)	(0.038)	(0.03)
Age	0.004	0.004	0.004
	(0.005)	(0.008)	(0.006)
Age2	-0.0001	-0.0001	-0.0001
	(0.0001)	(0.0001)	(0.0001)
Higher degree	0.274**	0.334**	0.229*
	(0.103)	(0.158)	(0.135)
1st degree	0.168**	0.233*	0.108
	(0.084)	(0.128)	(0.003)
Hnd, hnc, teaching	0.076	0.141	0.02
	(0.09)	(0.137)	(0.121)
A level	0.042	0.05	0.036
	(0.078)	(0.12)	(0.103)
O level	0.125	0.169	0.094
	(0.076)	(0.115)	(0.104)
Cse	0.088	-0.036	0.167
	(0.127)	(0.202)	(0.163)
Married	-0.061***	-0.025	-0.09***
	(0.017)	(0.024)	(0.023)
Anychild	0.048**	0.079**	0.037**
	(0.015)	(0.024)	(0.019)
Region	0.028	0.034	0.023
	(0.022)	(0.034)	(0.028)
Health	-0.007	-0.017	0.005
	(0.024)	(0.032)	(0.038)
Constant	0.169	0.07	0.241
	(0.13)	(0.21)	(0.167)
Obs	40963	17159	23804
Population size	10885	5021	5864
R-square	0.055	0.074	0.041
F-test	45.3	15.81	30.54
Prob>F	0.000	0.000	0.000
Regression	Table 3.5 (3)	Table 3.6 (5)	Table 3.6 (6)

* p<0.10, ** p<0.05, *** p<0.01

E.

Norga	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.
Meannorga	0.637***	0.803***	0.749***	0.935***	0.627***	0.74***
	(0.073)	(0.064)	(0.073)	(0.086)	(0.09)	(0.102)
Age	0.046	0.021**	0.024**	0.012	0.006	0.022
	(0.032)	(0.011)	(0.011)	(0.01)	(0.015)	(0.038)
Age2	-0.0003	-0.0002	-0.0002*	-0.0001	-0.0002	-0.0005
	(0.0004)	(0.0001)	(0.0001)	(0.0001)	(0.0002)	(0.0004)
Higher degree	0.647	0.459**	0.638*	-0.603		
	(0.738)	(0.211)	(0.365)	(0.621)		
1st degree	0.249	0.393**	0.484**	-0.001	-0.112	
	(0.713)	(0.197)	(0.246)	(0.199)	(0.425)	
Hnd, hnc, teaching	-0.13	0.196	0.169	0.188	-0.047	
	(0.994)	(0.213)	(0.238)	(0.183)	(0.315)	
A level	0.101	0.188	0.186	-0.05	-0.24	0.371
	(0.762)	(0.198)	(0.227)	(0.153)	(0.215)	(0.432)
O level	0.086	0.283	0.222	0.021	-0.289	-0.348
	(0.685)	(0.201)	(0.224)	(0.148)	(0.194)	(0.31)
Cse		0.124	0.064	0.675**	-0.37	-0.822
		(0.345)	(0.312)	(0.246)	(0.274)	(0.633)
Married	-0.198**	-0.065*	-0.027	-0.099*	0.043	-0.242*
	(0.089)	(0.035)	(0.035)	(0.039)	(0.054)	(0.124)
Anychild	0.176**	0.021	0.034	0.049	-0.038	-0.128
	(0.08)	(0.029)	(0.035)	(0.032)	(0.046)	(0.104)
Region	-0.024	0.04	0.098	0.008	-0.221*	
	(0.072)	(0.037)	(0.066)	(0.093)	(0.126)	
Health	0.189	0.04	-0.04	-0.051	0.021	-0.117
	(0.16)	(0.05)	(0.049)	(0.062)	(0.068)	(0.151)
Constant	-1.081	-0.779**	-0.9**	-0.293	1.148**	0.366
	(0.949)	(0.318)	(0.365)	(0.377)	(0.506)	(0.806)
Obs	2403	14726	8824	8451	5186	936
Population size	1050	5139	3691	3264	2535	562
R-square	0.086	0.07	0.04	0.002	0.002	0.012
F-test	8.71	14.83	10.15	12.76	6.49	7.95
Prob>F	0.000	0.000	0.000	0.000	0.000	0.000
Regression	Table 3.7 C (1)	Table 3.7 C (2)	Table 3.7 C (3)	Table 3.7 C (4)	Table 3.7 C (5)	Table 3.7 C (6)

* p<0.10, ** p<0.05, *** p<0.01

Appendix C. 4. Correlation between active memberships and employment status in the fixed effects IV model

	(1) feiv	(2) feiv	(3) feiv	(4) feiv	(5) feiv	(6) feiv	(7) feiv	(8) feiv
Political Party	0.097 (0.080)							
Trade union		1.396*** (0.058)						
environmental group			0.053 (0.066)					
parents association				0.247*** (0.042)				
tenants group					0.104** (0.044)			
religious group						0.174*** (0.049)		
voluntary group							-1.146*** (0.062)	
pensioners organisation								0.700*** (0.183)
Age	0.016*** (0.001)	0.012*** (0.002)	0.016*** (0.001)	0.014*** (0.001)	0.016*** (0.001)	0.016*** (0.001)	0.014*** (0.001)	0.016*** (0.001)
Age2	-0.0002*** (0.00001)	-0.0001*** (0.00002)	-0.0002*** (0.00001)	-0.0001*** (0.00001)	-0.0002*** (0.00001)	-0.0002*** (0.00001)	-0.0002*** (0.00002)	-0.0002*** (0.00001)
Higher degree	0.044* (0.024)	-0.031 (0.043)	0.046* (0.024)	0.046* (0.025)	0.043* (0.024)	0.062** (0.025)	0.055* (0.032)	0.042* (0.024)
1st degree	0.021 (0.019)	-0.022 (0.034)	0.022 (0.019)	0.020 (0.020)	0.019 (0.019)	0.032 (0.020)	0.011 (0.026)	0.017 (0.020)
Hnd, hnc, teaching	0.035* (0.021)	0.017 (0.036)	0.035* (0.021)	0.023 (0.021)	0.034* (0.021)	0.039* (0.021)	0.030 (0.027)	0.031 (0.021)
A level	0.042** (0.017)	0.007 (0.030)	0.042** (0.017)	0.041** (0.018)	0.041** (0.017)	0.049*** (0.018)	0.023 (0.023)	0.041** (0.017)
O level	0.037** (0.017)	0.009 (0.030)	0.038** (0.017)	0.031* (0.018)	0.037** (0.017)	0.042** (0.017)	0.026 (0.023)	0.032* (0.017)
Cse	-0.018 (0.029)	-0.065 (0.051)	-0.017 (0.029)	-0.022 (0.030)	-0.024 (0.029)	-0.006 (0.029)	-0.023 (0.038)	-0.022 (0.029)
Married	0.016*** (0.004)	0.020*** (0.007)	0.016*** (0.004)	0.018*** (0.004)	0.015*** (0.004)	0.015*** (0.004)	0.010* (0.005)	0.016*** (0.004)
Anychild	-0.013*** (0.003)	-0.009 (0.006)	-0.013*** (0.003)	-0.029*** (0.004)	-0.014*** (0.003)	-0.016*** (0.004)	-0.010** (0.004)	-0.013*** (0.003)
Region	-0.014*** (0.005)	-0.012 (0.009)	-0.014*** (0.005)	-0.016*** (0.005)	-0.014*** (0.005)	-0.015*** (0.005)	-0.017*** (0.007)	-0.014*** (0.005)
Health	-0.028*** (0.005)	-0.015 (0.010)	-0.028*** (0.005)	-0.027*** (0.006)	-0.027*** (0.006)	-0.027*** (0.006)	-0.020*** (0.007)	-0.028*** (0.006)
Constant	0.599*** (0.029)	0.580*** (0.051)	0.598*** (0.029)	0.625*** (0.030)	0.595*** (0.029)	0.580*** (0.030)	0.713*** (0.039)	0.601*** (0.029)
Sample Size	50375	50375	50375	50375	50375	50375	50375	50375
Respondent size	12520	12520	12520	12520	12520	12520	12520	12520
R-square	0.023	0.012	0.024	0.016	0.021	0.017	0.004	0.022

* p<0.10, ** p<0.05, *** p<0.01

Appendix C. 4. Continued

	(9) feiv	(10) feiv	(11) feiv	(12) feiv	(13) feiv	(14) feiv	(15) feiv	(16) feiv
Scout/guides organisations	0.927*** (0.082)							
Professional organisation		0.283*** (0.032)						
Other community group			0.083 (0.059)					
Social group				0.684*** (0.038)				
Sports club					0.756*** (0.039)			
Womens institute						0.355* (0.206)		
Womens group							0.417*** (0.129)	
Other organisation								0.357*** (0.040)
Age	0.016***	0.015***	0.016***	0.019***	0.020***	0.016***	0.016***	0.016***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)
Age2	-0.0002***	-0.0002***	-0.0002***	-0.0002***	-0.0002***	-0.0002***	-0.0002***	-0.0002***
	(0.00001)	(0.00001)	(0.00001)	(0.00002)	(0.00002)	(0.00001)	(0.00001)	(0.00001)
Higher degree	0.051* (0.027)	-0.0004 (0.025)	0.046* (0.024)	0.020 (0.032)	0.020 (0.041)	0.043* (0.024)	0.048** (0.024)	0.063** (0.026)
1st degree	0.032	0.002	0.022	-0.009	0.018	0.019	0.021	0.034
	(0.022)	(0.020)	(0.019)	(0.026)	(0.033)	(0.019)	(0.019)	(0.021)
Hnd, hnc, teaching	0.030 (0.023)	0.035* (0.021)	0.036* (0.021)	0.029 (0.027)	0.068* (0.035)	0.033 (0.021)	0.036* (0.021)	0.042* (0.022)
A level	0.042**	0.048***	0.043**	0.029	0.067**	0.041**	0.042**	0.048***
	(0.019)	(0.018)	(0.017)	(0.023)	(0.029)	(0.017)	(0.017)	(0.018)
O level	0.039**	0.042**	0.038**	0.013	0.026	0.038**	0.038**	0.046**
	(0.019)	(0.018)	(0.017)	(0.023)	(0.029)	(0.017)	(0.017)	(0.018)
Cse	-0.021	-0.019	-0.017	-0.068*	0.022	-0.019	-0.018	0.002
	(0.032)	(0.030)	(0.029)	(0.038)	(0.049)	(0.029)	(0.029)	(0.031)
Married	0.021***	0.017***	0.016***	0.022***	0.039***	0.015***	0.016***	0.017***
	(0.004)	(0.004)	(0.004)	(0.005)	(0.007)	(0.004)	(0.004)	(0.004)
Anychild	-0.023***	-0.012***	-0.014***	-0.006	0.006	-0.014***	-0.014***	-0.014***
	(0.004)	(0.004)	(0.003)	(0.005)	(0.006)	(0.003)	(0.003)	(0.004)
Region	-0.016***	-0.016***	-0.014***	-0.020***	-0.016*	-0.013***	-0.014***	-0.016***
	(0.006)	(0.005)	(0.005)	(0.007)	(0.008)	(0.005)	(0.005)	(0.005)
Health	-0.027***	-0.030***	-0.027***	-0.024***	-0.024**	-0.028***	-0.029***	-0.025***
	(0.006)	(0.006)	(0.006)	(0.007)	(0.009)	(0.006)	(0.006)	(0.006)
Constant	0.590***	0.632***	0.597***	0.477***	0.256***	0.593***	0.594***	0.580***
	(0.032)	(0.030)	(0.029)	(0.039)	(0.052)	(0.029)	(0.029)	(0.031)
Sample Size	50375	50375	50375	50375	50375	50375	50375	50375
respondent size	12520	12520	12520	12520	12520	12520	12520	12520
r-square	0.011	0.023	0.024	0.004	0.019	0.019	0.019	0.016

* p<0.10, ** p<0.05, *** p<0.01

Appendix C. 5. First Stage regression results between each active membership and employment status

	orgaa	orgab	orgac	orgad	orgae	orgaf	orgag	orgap
meanorgaa	0.683*** (0.022)							
meanorgab		0.808*** (0.028)						
Meanorgac			0.714*** (0.028)					
Meanorgad				0.699*** (0.028)				
Meanorgae					0.811*** (0.028)			
Meanorgaf						0.457*** (0.022)		
Meanorgag							0.796*** (0.029)	
Meanorgap								1.057*** (0.035)
Age	0.0006 (0.0004)	0.003** (0.001)	-0.0002 (0.001)	0.007*** (0.001)	0.002* (0.001)	0.001 (0.001)	-0.002** (0.001)	-0.0002 (0.0002)
Age2	-6.24E-06 (5.33E-06)	-0.00003** (0.00001)	3.78E-06 (7.84E-06)	-0.0001*** (0.00001)	-0.00002 (0.00001)	-0.00001 (0.00001)	0.00002** (0.00001)	2.10E-06 (2.39E-06)
Higher degree	0.016 (0.01)	0.057** (0.025)	-0.007 (0.014)	0.002 (0.024)	0.026 (0.019)	-0.096*** (0.024)	0.008 (0.019)	0.004 (0.004)
1st degree	0.005 (0.008)	0.037* (0.02)	-0.003 (0.012)	0.01 (0.019)	0.022 (0.015)	-0.065*** (0.019)	-0.008 (0.015)	0.006* (0.004)
Hnd, hnc, teaching	0.003 (0.008)	0.015 (0.022)	0.002 (0.012)	0.05** (0.02)	0.013 (0.016)	-0.03 (0.02)	-0.006 (0.016)	0.006 (0.004)
A level	0.004 (0.007)	0.029 (0.018)	0.005 (0.01)	0.005 (0.017)	0.007 (0.014)	-0.041** (0.017)	-0.018 (0.013)	0.002 (0.003)
O level	0.003 (0.007)	0.025 (0.018)	0.008 (0.01)	0.03* (0.017)	0.008 (0.014)	-0.029* (0.017)	-0.011 (0.013)	0.007** (0.003)
Cse	0.003 (0.012)	0.041 (0.03)	-0.022 (0.017)	0.022 (0.029)	0.057** (0.023)	-0.068** (0.028)	-0.004 (0.022)	0.005 (0.005)
Married	-0.001 (0.002)	-0.003 (0.004)	0.001 (0.002)	-0.01** (0.004)	0.004 (0.003)	0.003 (0.004)	-0.005 (0.003)	-0.0008 (0.0007)
Anychild	-0.001 (0.001)	-0.003 (0.004)	-0.003 (0.002)	0.063*** (0.003)	0.002 (0.003)	0.016*** (0.003)	0.003 (0.003)	-0.0004 (0.001)
Region	0.003 (0.002)	-0.005 (0.005)	0.002 (0.003)	0.005 (0.005)	0.00004 (0.004)	0.003 (0.005)	-0.004 (0.004)	-0.0003 (0.001)
Health	0.001 (0.002)	-0.008 (0.006)	0.001 (0.003)	-0.001 (0.005)	-0.002 (0.004)	-0.002 (0.005)	0.007 (0.004)	0.0001 (0.001)
Constant	-0.022* (0.012)	-0.055* (0.03)	-0.001 (0.017)	-0.148*** (0.029)	-0.045** (0.023)	0.045 (0.029)	0.06** (0.022)	0.0002 (0.005)
Obs	50375	50375	50375	50375	50375	50375	50375	50375
Population size	12520	12520	12520	12520	12520	12520	12520	12520
R-square	0.037	0.033	0.025	0.079	0.039	0.023	0.025	0.01
F-test	73.1	66.88	50.15	101.61	68.89	40.96	61.43	69.94
Prob>F	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Regression	Appendix C.8 (1)	Appendix C.8 (2)	Appendix C.8 (3)	Appendix C.8 (4)	Appendix C.8 (5)	Appendix C.8 (6)	Appendix C.8 (7)	Appendix C.8 (8)

Appendix C. 5. Continued

	orgaq	orgao	orgah	orgai	orgaj	orgak	orgal	orgam
meanorgaq	0.749*** (0.029)							
meanorgao		0.682*** (0.02)						
meanorgah			0.869*** (0.032)					
meanorgai				0.67*** (0.025)				
meanorgaj					0.635*** (0.026)			
meanorgak						0.641*** (0.033)		
meanorgal							0.783*** (0.03)	
meanorgam								0.79*** (0.03)
Age	-0.001 (0.001)	0.001 (0.001)	-1.93E-06 (0.001)	-0.001 (0.001)	-0.005** (0.002)	-0.0002 (0.0003)	-2.67E-07 (0.0003)	0.001 (0.001)
Age2	5.36E-06 (7.04E-06)	-5.98E-07 (0.00001)	4.19E-07 (8.00E-06)	9.43E-06 (0.00002)	0.00003 (0.00002)	2.95E-06 (3.30E-06)	-3.06E-07 (3.87E-06)	-8.30E-06 (0.00001)
Higher degree	-0.012 (0.013)	0.137*** (0.023)	0.002 (0.015)	0.042 (0.031)	0.028 (0.043)	0.007 (0.006)	-0.006 (0.007)	-0.04* (0.024)
1st degree	-0.015 (0.011)	0.063*** (0.018)	-0.002 (0.012)	0.053** (0.025)	0.002 (0.035)	0.008* (0.005)	0.004 (0.006)	-0.034* (0.02)
Hnd, hnc, teaching	0.001 (0.011)	-0.004 (0.019)	-0.01 (0.013)	0.016 (0.026)	-0.043 (0.037)	0.006 (0.005)	-0.001 (0.006)	-0.017 (0.021)
A level	-0.004 (0.009)	-0.012 (0.016)	-0.012 (0.011)	0.025 (0.022)	-0.029 (0.031)	0.004 (0.004)	0.003 (0.005)	-0.017 (0.017)
O level	-0.006 (0.009)	-0.012 (0.016)	0.0002 (0.011)	0.039* (0.022)	0.019 (0.031)	0.0002 (0.004)	0.001 (0.005)	-0.024 (0.017)
Cse	-0.001 (0.016)	0.005 (0.027)	-0.006 (0.018)	0.082** (0.037)	-0.05 (0.05)	0.001 (0.007)	0.001 (0.009)	-0.052* (0.029)
Married	-0.006** (0.002)	-0.006 (0.004)	-0.003 (0.002)	-0.008* (0.005)	-0.033*** (0.007)	0.0004 (0.001)	-0.001 (0.001)	-0.005 (0.004)
Anychild	0.011*** (0.002)	-0.005 (0.003)	0.003 (0.002)	-0.01** (0.004)	-0.023*** (0.006)	0.001 (0.001)	0.001 (0.001)	0.004 (0.003)
Region	0.002 (0.003)	0.007 (0.005)	0.001 (0.003)	0.005 (0.006)	0.001 (0.009)	-0.003** (0.001)	-0.001 (0.001)	0.006 (0.005)
Health	-0.002 (0.003)	0.007 (0.005)	-0.003 (0.003)	-0.005 (0.007)	-0.004 (0.01)	0.0004 (0.001)	0.004** (0.002)	-0.007 (0.006)
Constant	0.017 (0.016)	-0.054** (0.027)	0.002 (0.018)	0.67*** (0.025)	0.635*** (0.026)	0.009 (0.007)	0.002 (0.01)	-0.017 (0.029)
Obs	50375	50375	50375	50375	50375	50375	50375	50375
Population size	12520	12520	12520	12520	12520	12520	12520	12520
R-square	0.026	0.127	0.023	0.024	0.044	0.01	0.018	0.028
F-test	52.89	114.34	58.19	64.69	60.32	29.32	53.73	56.27
Prob>F	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Regression	Appendix C.8 (9)	Appendix C.8 (10)	Appendix C.8 (11)	Appendix C.8 (12)	Appendix C.8 (13)	Appendix C.8 (14)	Appendix C.8 (15)	Appendix C.8 (16)

* p<0.10, ** p<0.05, *** p<0.01

Appendix C. 6.
Principal component analysis

Principal components (eigenvectors) (blanks are abs(loading)<.3)

	comp1	comp2	comp3	unexplained
Political party	0.4217	0.3178		0.347
Trade union		0.4659		0.4566
Environmental group	0.4003			0.5271
Parents association				0.6346
Tenants group	0.3149			0.6508
Religious group		-0.4027		0.497
Voluntary group	0.367			0.6023
Professional organization			0.4735	0.4848
Other community group	0.3758			0.5777
Social group		0.6401		0.3905
Sports club			0.7703	0.2777

Scoring coefficients

	Comp 1	Comp2	Comp3
Political party	0.4217	0.3178	-0.1567
Trade union	0.2506	0.4659	0.086
Environmental group	0.4003	0.0773	-0.0756
Parents association	0.2875	-0.2428	0.1513
Tenants group	0.3149	0.0354	0.1191
Religious group	0.2893	-0.4027	0.1728
Voluntary group	0.367	-0.0926	-0.0481
Professional organization	0.2281	-0.1471	0.4735
Other community group	0.3758	-0.0653	-0.2331
Social group	-0.0114	0.6401	0.1454
Sports club	-0.0743	0.0968	0.7703

Kaiser-Meyer-Olkin measure of sampling adequacy

	KMO
Political party	0.7534
Trade union	0.6868
Environmental group	0.8072
Parents association	0.8104
Tenants group	0.8398
Religious group	0.761
Voluntary group	0.8281
Professional organization	0.7751
Other community group	0.822
Social group	0.5543
Sports club	0.5406
Overall	0.7675

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