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Volume 10 – June 2014

Including high quality essays from UEA students in our Exemplary Student Essays feature and a Lifestyle and Reviews section.
The Norwich Economic Papers
Volume 10- June 2014

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Foreword

Dear All,

It is with great pleasure I showcase Volume 10 of the Norwich Economic Papers Series, and the second and final volume from this year’s board. It is the aim of this year’s board to provide a medium that showcases individual academic excellence as well as providing a platform from which to offer advice surrounding academic life.

This Volume features exemplary essays from Economics students at UEA, essays selected for their exceptional marks and fascinating insights across a wide range of topics. We hope these essays act as a source of inspiration for all students in their future academic achievements. We also include a Lifestyle and Reviews feature that offers insights from life at university from different perspectives, as well as reviews on a popular economics book and a critique of the rise of virtual currency Bitcoin.

On behalf of the Editorial Board I hope you have an enjoyable summer and wish you all the best whether you are returning in September or moving on to something new and exciting.

Cameron Belton

Editor,
Norwich Economic Papers
Part I- Exemplary Student Essays

Show, using UK and US data, that the variability of the consumption-output ratio is lower than that of the investment-output ratio (consumption smoothing).

How do intertemporal based theories explain the phenomenon of consumption smoothing?

Steven Ram
Principles of Macroeconomics

Introduction
UK and US data show, that consumption is less volatile than investment. Yet, both are a function of income. This essay aims to shed light on this puzzle from the consumption side, by demonstrating that consumption is less volatile than income – a phenomenon called consumption smoothing.

There are a number of differing approaches to consumption smoothing up to this date. Broadly speaking, two non-conflicting strands of thinking have emerged: One thinking along the lines of Friedman’s 1957 permanent income hypothesis (PIH/REPIH), and the other along the lines of Modigliani’s 1940-50s life-cycle hypothesis (LCH) (Fernandez-Corugedo 2004). The explanations in this essay are based on the latter.

The structure is as follows. First, I will constitute that the volatility of the consumption-output ratio is indeed lower than that of the investment-output ratio. This will raise the question of why there is such an excess smoothness. Second, to explain the excess smoothness theoretically, I will present Modigliani’s LCH, together with its roots in Irving Fisher’s 1930s model of intertemporal choice (Deaton 2005, Modigliani 1986, Thaler 1997). Third, I will test the hypothesis against Gourinchas’ and Parker’s empirical evidence. Having found the extent of smoothing to be less than predicted by the LCH, I will end with two limitations of the LCH that could explain this result.
Let us first constitute, that the volatility of the consumption-output ratio $C/Y$ is indeed lower than that of the investment-output ratio $I/Y$. The given data is quarterly UK and US data from 1955 to 2005 augmented by ONS and BEA GDP data. When plotting the changes in $C/Y$, $I/Y$ and $Y$ over time, the graphs illustrate that consumption is less volatile than investment (Fig. 1). The coefficients of variation express the same observation numerically (Fig. 2). One caveat is that the difference in volatility may partly be explained by the high volatility of investment relative to income, due for example to the accelerator principle (Sloman et al. 2012). However, the difference cannot be accounted for by volatile investment alone. As I will explore in this essay, consumption is also less volatile than income – there is excess smoothness (Fernandez-Corugedo 2004).
How do intertemporal choice theories explain the excess smoothness? To begin with, intertemporal choice is the choice between giving up some consumption now for more consumption later and vice versa. To show how this ties in with consumption smoothing, I will first outline Fisher’s model, and then expand to Modigliani’s LCH.

In Fisher’s model, we start with agents who are endowed with a current income $Y_1$, and an expected future income $Y_2$. In each of the two periods 1 and 2 they consume $C_1$ and $C_2$ respectively. What is at the heart of this model, is that current and future consumption can theoretically be “exchanged” for each other. In practice, this exchange is plain borrowing and saving.

Suppose now, all future income is borrowed into the present. The agent will be able to consume at the maximum possible present consumption $C_1^{\text{max}}$. Note, however, that, because of the interest to be paid, any borrowing is discounted by the real interest rate $r$. Similarly, when saving everything now, agents can consume at the maximum later $C_2^{\text{max}}$. Interest payments are then added, not discounted:

$$C_1^{\text{max}} = Y_1 + \frac{1}{(1 + r)}Y_2$$
$$C_2^{\text{max}} = Y_2 + (1 + r)Y_1.$$  

If we now, in the latter equation, allow for a proportion to be consumed in period 1, all
feasible combinations of $C_1$ and $C_2$ are defined. We call this the intertemporal budget constraint (IBC): \[ C_2 = Y_2 + (1 + r)Y_2 - (1 + r)C_1. \] Which feasible combination the agent chooses to maximise utility depends on their individual preferences, reflected in their indifference map (Fig. 3) (Mankiw 2013).

What is important about Fisher’s model for our purposes, is that agent’s consider both their current income and their expected future income for consumption decisions. This displaces Keynes earlier hypothesis, that only current income matters (Mankiw 2013). On the basis of this insight, Modigliani develops his LCH to explain consumption smoothing.

We assume a life-cycle to have two periods, the working phase and the retirement phase. Other assumptions are that agents generally prefer less variation in consumption (Modigliani 1986) and that they do not face borrowing constraints.

In the working phase, there is labour income to finance consumption. But in the retirement phase, there will not. So, at retirement, a drop to zero consumption along with labour income has to be avoided somehow. Agents do that by saving some of their working phase income to dissave it (consuming out of savings rather than income) during their retirement phase (Fig. 4) (Mankiw 2013, Modigliani 1986).

In Fisher’s terms some of $C_1$ is exchanged for $C_2$. Thus, the indifference map would be such that optimal consumption lies above the endowment point. Mind though, that in this case the endowment would lie at $\text{Endowment}$, because we defined income in the retirement phase to be zero.

Therefore, this simple hypothesis, of common life-cycle events, motivating every consumer to save and smooth their consumption, provides a plausible explanation for the overall low volatility of consumption.

On relaxing the assumption of only two phases, more irregularities in income would emerge, e.g. lower income in the pre-working phase, a parenting phase etc. It would not change our result, however, because all life-cycle irregularities could theoretically be smoothed with borrowing and saving. As will become clear in the last part, the other two assumptions are necessary.
Let us now do some empirical testing of this hypothesis. Gourinchas and Parker have analysed the consumption data of around 40,000 US households from 1980 to 1993 (Fig. 5). As it only ranges up to retirement age, we can only test consumption behaviour during the working phase. Moreover, it is safe to ignore the peculiarities of the early years here (Gourinchas & Parker 2002).

Taking the LCH literally, we would expect consumption data to form a flat line lying below current income (Fig. 4). Taking Keynes literally, we would expect consumption to run almost parallel to current income (Mankiw 2013). What we see in Fig. 5, however, is the middle ground. Consumption resembles the income curve in its hump shape, which indicates that current income indeed has more weight than expected. Yet, consumption is flatter. Therefore, we do observe some moderate smoothing. But is this smoothening due to life-cycle considerations?

Notice that consumption is peaking *before* income, with income still rising. A conscious decision to cut consumption, related to saving for retirement, and not to the missing cut in income, could be an explanation. And that is consistent with further empirical evidence. In Fig. 6 Gourinchas and Parker isolate retirement-motivated savings from total savings. The data show a rather constant and low level until the agent’s mid-30s. These savings are assumed to be precautions against shocks. Past that age, however, savings abruptly shoot up.
It has intuitive appeal to interpret an increase at this moment in the life-cycle as saving for retirement. Therefore, we can conclude that, despite the more pronounced than expected role of current income, life-cycle events do nonetheless have a smoothening effect on consumption.

It is still left to explain, however, why consumption turns out more dependant on income than predicted. I am suggesting here two reasons: Impatience and borrowing constraints.

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**Fig. 5:** consumption & income over the life-cycle

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**Fig. 6:** retirement-motivated saving

![Graph showing retirement-motivated saving.](image)
Impatience. Laibson’s behavioural research suggests that consumers prefer instant gratification. Consequently, future income and consumption are discounted irrationally heavily (Laibson 2005). Using 1948-78 US data, Hayashi estimates the discount rate to lie 25% above the real interest rate (Hayashi 1982). This feeds into our analysis in two ways. On the one hand, a higher discount rate is an explanation for a more prominent role of current income in consumption decisions (Muellbauer 1994).

\[
\Delta C_t = \Delta Y_t + \frac{1}{(1 + r_d)} \Delta Y_{t+1} - \frac{1}{(1 + r_d)} \Delta C_{t+1}
\]

As the discount rate \(r_d\) rises, the change in consumption becomes increasingly dependent on changes in current income. Hence, the generally more hump shaped than flat curve.

On the other hand, however, we probably have to drop our assumption of the interest and discount rate to be the same for saving and borrowing. If the assumption held, we would expect undersaving, which conflicts with the data (Fig. 5).

Borrowing constraints. Some consumers may face borrowing constraints, because banks are unwilling or unable to lend. There is a tendency for borrowing-constrained consumers also to have low incomes (Muellbauer 1994). For example consider different life-cycle phases again: Consumers in their young pre-working phase will likely face borrowing constraints and low income. If that is the case, then there is less scope for saving, which makes them more vulnerable to income or expenditure shocks. Without the ability to compensate for shocks with either savings or borrowing, there is no alternative but to vary consumption along with income (Deaton 1991).

Conclusion

Summing up then, we have discovered excess smoothness in UK and US consumption data relative to investment, but also noted that it is crucial to examine consumption relative to income. Subsequently, with Fisher’s and Modigliani’s theories, we have revealed mechanisms behind the smoothing. From a theoretic perspective, the LCH provides an explanation with much intuitive appeal, as life-cycle events are realities which everybody can relate to, and which require conscious consumption or saving decisions. Empirically, however, it turned out that while there is evidence for the predicted mechanisms to work, they do not smooth consumption to the extent predicted. Irrational impatience as well as borrowing constraints are two limitations of the LCH that may account for the higher than expected weighting of current income in consumption decisions.
References


The importance of health and education in economic development is beyond dispute, and yet the poor are often seen to underinvest in both health and education of their children, even when they are easily affordable or entirely free.

Provide an in-depth analysis of this issue by considering two countries, where significant interventions have been made in either health or education or both, and evaluate their experience to answer the question.

Will O’Donnell
Development Economics

It is essential we understand the relationship between health and education and its effects on economic development in the developing world. Human Capital in its broadest sense encompasses the levels of education, health, and nutrition of the population. Few processes are as intertwined with development as human capital accumulation. Education increases productivity, speeds technological advancements, and increases the probability of more healthy productive children, all of which promotes economic development. Growth, in turn, incentivizes investment in human capital. Vogl (2012) states that ‘Causal links point in every direction, traversing phases of the lifecycle as well as generations’1. It is therefore no wonder that governments of developing countries increasingly concern themselves with the underinvestment by the poor in both health and education. In this assignment I will provide a brief overview of some literature on the topic, and then compare two contrasting cases.

Firstly I will discuss some of the more general arguments of why the poor tend to underinvest. A frequently cited reason for this behaviour is that poor families are myopic in their decision-making process. The traditional human capital model assumes that individuals are utility maximisers and that they can take a lifetime view when deciding whether to invest in education, comparing the present value of benefits with the costs of investment. However in reality, poor families face an investment decision, where they must juggle current subsistence needs against investments in schooling that carry a remote and uncertain payoff. It is therefore easy for these particular individuals to be myopic or ‘short-sighted’ in their economic outlook, underestimating or disregarding the evident returns to education. This causes an inability to effectively internalise the returns to education and health in their decision making process. As a result, many children in developing countries have a sub-
standard level of health and educational attainment.

Secondly, several studies show that the main cost factor influencing this underinvestment into education is the opportunity cost, which is the forgone family income from children’s potential earnings (Basu 1999; Strauss and Thomas 1995). These opportunity costs are larger for poor, rural families with many small children (Behrman, Pollak and Taubman 1989). Family size and opportunity costs make liquidity constraints more binding, leading to an underinvestment into health and education across the developing world.

Thirdly, a wealth of the literature on the topic of human capital in development has found an intergenerational transmission between education and poverty, forcing low-income families to be stuck in a vicious cycle which ultimately ends in low educational attainment. Children born into disadvantaged families are at higher risk of experiencing malnutrition, illnesses, and home environments less conducive to learning, and they tend to receive a lower quality of schooling. They therefore tend to develop less motivation to learn. It is near impossible to reverse the impact that these deficiencies in a child’s early years can have on the development of skills during youth and adulthood through normal education. Poor children therefore face important long-term learning constraints even in the absence of short-term liquidity constraints to attending school.

Moreover, households in developing countries often lack information on the returns to investing in preventative behaviour and that their health behaviour is responsive to information. But information, or rather the source of information, has to be credible for it to make a difference. Information campaigns carried out by governments with a bad track record might be doomed to fail. For example, Egypt was extremely successful at reducing the incidence of child deaths due to awareness campaigns. In India few children with diarrhoea were treated with preventative measures in the early 1990s, despite 10 years of vigorous campaigning by the Indian government (Rao et al. 1998). One could hypothesize that the lack of success of the Indian government’s ORT campaign was related to the forced sterilization effort carried out by the government during the state of emergency between 1975 and 1977, and the subsequent distrust, among the population, of any government initiative related to family issues.

The essential question is whether demand or supply-augmented policies are most useful.
Most programs designed to increase school enrolments among the poor build schools closer to where they live, increase the resources for the schools in terms of raising teacher salaries and training, reducing class-size, and augmenting other educational inputs. These supply approaches may increase enrolments in some cases, but may not be especially effective in increasing enrolment among the poor, leaving a wide and possibly growing gap between the educational attainment of the children of the poor and rich (Deolalikar, 1997). One could argue that if Mexico and India already have a high unequal distribution of income; demand policies would be more suitable to countering the divide.

Analysing Mexico and India will be extremely useful. Comparing two developing countries from the same continent seems relatively pointless, as they will tend to have more in common economically, politically and culturally. In both these countries, varying factors are at play which means that they are more likely to suffer from underinvestment in human capital, namely the high levels of income inequality. The interventions made by each country have been extremely different, offering a good juxtaposition of policies for analysis.

In Latin America, an educational divide keeps uneducated, poor families in persistent poverty. Latin America is divided between individuals who are highly educated and those who have little education, and this divide is simultaneously a cause and an effect of subsistence incomes across generations. Since the level of education and health of the parent is strongly correlated with children’s educational attainment, the educational divide is self-reinforcing across generations, suggesting a form of ‘education trap’ which is hard to break out of.

Moreover, cultural biases against females attending secondary school and the financial benefits families gain from the marriage of their young teenage daughters have hindered girls’ participation in education in Latin American countries. To encourage families to send girls to school, Progresa provided girls with a higher payout for attending secondary school than similarly aged boys. This may be deemed inequitable; however drastic measures have to be taken in order to reverse long standing cultural biases in pursuit of better investment into health and education.

The Mexican government implemented Progresa in 1997, covering 2.6 million families in rural areas by the year 2000. It was designed to reduce poverty by providing cash payments
to families in exchange for regular school attendance, health clinic visits, and nutritional support. The two-pronged attack of Progresa recognised the intergenerational transmission of education and health and thus was seen to be a suitable intervention; however improving access to education is not sufficient to achieve improved educational attainment among children. As discussed earlier, poor children face considerable barriers to learning due to poor health. In the case of Mexico, Anaemia has decreased the work potential of females (Haas and Brownlie, 2001) with severe knock-on effects for economic development.

The cash payments were implemented in order to reduce the opportunity cost faced by poorer families when making human capital investment decisions. Poor families often rely on the wage labour of their children – particularly in rural areas – even if they recognize the importance of education and wish to send their children to school. The ‘household demand’ approach provides subsidies which can be administratively targeted to the poor within a community, and perhaps thereby able to close the gap between enrolments and educational attainment of the poor and not-poor, reducing the substantial inequality in schooling and income found in Mexico and in many other parts of Latin America.

Progresa was extremely successful making improvements in health as well as education. Secondary school enrolment increased substantially, with the biggest impact among girls. Enrolment figures for boys increased by 10% and the enrolment figures for girls increased by 20%. Other substantial effects include an increase in consumption (mostly food intake) of 22%. The proportion of malnourished children decreased by 17.2% and regular health visits have increased by approximately 45% among young children under 5 (Skoufias, 2005).

In India, enrolment levels have increased substantially over the past few decades. This seems promising; however it is argued that policy members seem to relax once children start attending school. Though 93.4% of children aged 6-14 are enrolled in schools; 35% of children aged 7-14 cannot read a simple paragraph; 41% cannot do subtraction; 66% cannot do division (Pratham 2005). Many believe that simply building schools and hiring teachers is the main solution to improving education, but schools in developing countries deliver very little. Education may be affordable or entirely free as stated in the question; however the standard of education that is needed in order to break out of the poverty trap might only be accessible through private schooling, which is simply unaffordable for poorer families.
My essay will cover two specific interventions that India has made. The first intervention is specifically targeted to the weakest children: it is a remedial education program, where a young woman (balsakhi) from the community works on basic skills with children who have reached grade three or four without having mastered them. These children are taken out of the regular class-room to work with this young woman for 2 hours per day. The program has been implemented in twenty Indian cities, reaching tens of thousands of students. It was started in Mumbai in 1994, and expanded to Vadodara in 1999.

The second intervention could potentially benefit all children, but is adapted to a child’s current level of achievement: it is a computer-assisted learning program (CAL hereafter), where children in grade four are offered two hours of shared computer time per week, during which they play games that involve solving math problems at varying levels of difficulty. Both programs are provided by Pratham, a very large NGO operating in conjunction with government schools in India.

Despite experts on the subject stating that complementary technology could be extremely useful in the classroom, very little rigorous evidence on the impact of computers on educational outcomes for India or other developing countries exists. Moreover, the little evidence available is not encouraging. For example, Joshua Angrist and Victor Lavy (2002) evaluate a CAL program in Israeli schools with disappointing results. Among the fourth and eighth grade students evaluated with math and Hebrew exams, the data show no benefits and provide some evidence that children who received such instruction are actually at a disadvantage.

The remedial education program increased average test scores in the treatment schools by 0.14 standard deviations in the first year, and 0.28 in the second year. Moreover, the weaker students, who are the primary target of the program, gained the most. In the second year, children in the bottom third of the initial distribution gained over 0.40 standard deviations. The CAL program increased math scores by 0.35 standard deviations the first year, and 0.47 the second year, and was equally effective for all students. These results persist over time: one year after leaving the program, initially low scoring students who were in balsakhi schools still do better than their untreated counterparts, though the difference is smaller. Students of all levels perform better in math if they were in schools where the math CAL program was implemented.
These results show that it is possible to dramatically increase the quality of education in urban India, a very important result since a large fraction of Indian children cannot read when they leave school. Subsidizing schooling among the rural poor may thus be a development strategy that deserves more widespread consideration as a geographically and economically targeted policy which can both reduce entrenched intergenerational transmission of poverty and promote long-term economic growth. Both programs are inexpensive and can easily be brought to scale: the remedial education program has already reached tens of thousands of children across India. An important unanswered question, however, given the evidence of decay in the gains a year after the programs end, is whether these effects are only experienced in the short term, or can be sustained several years after the program ends, making a long-lasting difference in these children’s lives.

Experts – namely Banerjee and Duflo – argue that there is no point pushing children into school until there is a real value to education. Interventions should therefore be geared toward the quality of education, rather than simply increasing enrolment levels. On their ‘Poor Economics’ website, Banerjee and Duflo state that ‘Enormous gains can be made by focusing on teaching the basics and using technology to complement teachers’. Moreover, Nobel Prize winner (1998) Amartya Sen argued that the notion of development should mean an increased capability of people to pursue their well-being. Building schools is not enough; adequate measures should be taken to enable people to make use of the schools.

Progresa encouraged school attendance but did not emphasise performance unlike the CAL or ‘balsakhi’ policies examined in India. Educational attainment must be improved in order to increase the returns to education. In unequal societies, educational attainment offers the only means of climbing the social ladder where there are better employment prospects. It is promising that Progresa increased enrolment levels of poorer children, however if the Mexican government wants to make a dent in the large disparities between rich and poor, policies are needed which improve the standard of affordable education. This would have the effect of breaking the cycle of underinvestment into education over generations because families will internalise the higher return to education into their human capital decision making process.

Progresa was initially implemented in rural areas, whereas the influence of the bulsakhi
and CAL programs was purely in urban areas. In the end, all policies I analysed have had positive results. The fact that one was in an urban setting and the other was in a rural setting definitely had large impacts on the respective successes of the policies. Underinvestment into health and education is rife in rural areas across the developing world, not just in Mexico and India. This is due to individual preferences, cultural attitudes and the overall feelings toward employment practises, resulting in a lack of demand for education. This could possibly be the reason why Progresa has seen such impressive results.

Another difference in the two countries experiences is that households in Mexico under the influence of Progresa underwent improvements in overall health levels, whereas little improvement or change in health was documented in households under the influence of the Balsakhi or CAL programs in India. One cannot be entirely confident that this means that Progresa is the better policy because health levels may have reached an adequate level in the Indian cities studied before the two policies were implemented. Despite this, I would argue that Progresa’s two-pronged policy designed to have significant impacts on health and education levels has longer-lasting effects. As most of the literature on the topic shows, the intergenerational transmission of bad health and low educational attainment is problematic. Policies that attack both poor health and poor education would therefore be more effective at reducing the underinvestment phenomenon.

Naturally, sustainability is a concern. How long can the Mexican government afford these cash transfers? How can India justify widening the CAL program to reach rural areas or a wider proportion of the population, when returns to CAL type programs seem to be ineffective in developed countries, once a certain standard of education has been met? Progresa has been acknowledged for its cost effectiveness, the adequate targeting of beneficiaries, and its ability to sustain its integrity as an anti-poverty scheme, targeting the underinvestment in human capital by poorer families. The monitoring system of Progresa and the strong promotion of a human development approach are recognised as the main innovations of this intervention. The legacy of Progresa has yielded important lessons to the world, demonstrating that the overall development impact is higher when redistribution schemes are coupled with interventions aimed at improving human capital of the poor.

The Balsakhi program can also be brought to scale, since it has already reached tens of thousands of children across India. Evaluations conducted in two cities over two years
suggest that this is a remarkably efficient and cost-effective program. Banerjee et al (2005) suggest that the cost of the program is approximately $2 per student per year. The CAL program has also been widely reviewed as an extraordinary success. Contrary to what has been found in other countries, the use of technology to complement education has been useful; however no significant improvements in health have been documented.

To conclude, one cannot say that Progresa is the better policy, as the intervention may not have worked in India. Similarly, the balsakhi and CAL programs may not be fruitful if implemented in Mexico. Policy makers need to be extremely knowledgeable about the particular cultures and attitudes of their populations, understanding their needs and thought processes. Recent global economic and financial crises affected Mexico’s overall economic performance, noticeably reversing some of the impressive gains that had been made in the last decade. India has also been hit hard economically by the recent global financial crises, however more research is needed in testing whether the policies discussed in this essay prevented the recession from having a greater negative impact on both Mexico and India.
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There are different explanations of why certain countries are developed and other countries are still developing. Review three bodies of work, namely, the institutional theory, the geography theory and the growth theory, and evaluate their strengths and weaknesses in light of empirical evidence. Which theory would you endorse?

Cheuk Chung
Development Economics

In 21st century, some countries such as Western Europe, Canada and United States are more developed with high per capita GDP, but some countries are still developing like Latin America and Africa. The main reasons of different development levels can be explained by geography theory, institutional theory and growth theory. This essay will review and evaluate the strengths and weaknesses of those theories, in order to figure out which theory is more practical in explaining the long run development trend.

The first three sections will address the reviews and evaluations of the geography theory, the institutional theory and the growth theory separately. The fourth and fifth section will be the cross-model comparison and the conclusion.

I: geography theory

Geography theory is the theory that using the geographical differences to explain the growth and development. (Gallup et al., 1999) Climate and the land features are the main components of the theory. More specifically, they can be one of the key determinants of the economic productivity thus affect both short run and long run growth.

First of all, climate can have direct impacts on agricultural productivities. In general, withhold climate conditions can improve the land productivity which leads to higher agricultural productivity thus faster growth and development. According to the study by Master and McMillan (2000), the days of winter frost lead to different economic effects. As the pests and parasites bring negative effects on agriculture, the seasonal frost could kill the pests and parasites and raise the agricultural productivity. The frostless countries especially for the
tropical regions had 1% slower annual growth during 1960 to 1990 than the countries with frost.

More than that, the different climate conditions cause different disease patterns. Take Malaria as a typical example, there is a negative correlation between malaria and economic growth. The distribution and intensity of Malaria are depending on ecological conditions because of the malaria mosquito vectors. (Gallup, Sachs and Mellinger, 1999) The climate characteristics tropical and subtropical zones are hot and humid which is withhold for the malaria vectors to spread the disease. For those countries with intense malaria, they suffered from 1.3% less growth per person annually from 1950 to 1990. (Gallup & Sachs, 2000) This shows a negative relationship between malaria and economic growth. There are some potential negative impacts on economic growth which caused by malaria. For example, malaria might reduce the incentive for foreign direct investment and tourism. Also, the investors and tourists might stay away from those countries until they have improvements.

Next, the locations of the countries could have enormous effects on income growth. The factor of location can be divided into coastal area and hinterland. The coastal areas have better access to sea than the hinterland. The closer distance to the sea means that the costs of using sea transport are relatively lower than the regions located at the hinterland. Gallup, Sachs and Mellinger (1999) proved that the transport costs could have a large influence on growth theoretically by modified AK model. It implies that when the transport cost of hinterland is higher than the transport costs of the coastal regions by 5%. The coastal regions have 49% higher growth rate than the hinterland. In reality, the coastal regions have geographical advantages to support their international and interregional trade and communication. Therefore, coastal regions can achieve greater economic growth than hinterland. (Gallup, Sachs and Mellinger, 1999)

Evaluation:

The geography theory is strong in explaining the early stage of the economic development. For example, the withhold geographical factors lead Europe and United States to have the rapid growth in the early stage. Europe is located at the non-tropical region with good access
to the sea. The moderate climate condition and coastal location provide high agricultural productivity and the effective channels for international trade initially. For the United States, the high proportion of coastal population and temperate zone location are withheld for development. (Gallup, Sachs and Mellinger, 1999) They are the richest regions with the most rapid growth in the past.

On the other hand, it can explain why the tropical regions like Sub-Saharan Africa had the slowest growth in the past accurately. It is because of the geographical disadvantages. (Bloom et al., 1998) Most of the population was concentrated at hinterland and landlocked regions and only a small portion in the coastal region about 19%. (Gallup, Sachs and Mellinger, 1999) The long distance to the core market in Europe from their internal market lead to high transportation costs, the costs of sea transport are higher thus influence the efficiency of international trade and communication. In addition to the climate condition, the hot and humid climate leads to high malaria intensity and cause low agricultural productivity. Therefore, the economic growth of tropical regions was suffered from withheld geographical factors.

However, this approach might not able to explain the exceptional cases independently because some of the relevant variables have been neglected by the model. Korea and Hong Kong are the typical exceptional examples in illustrating the weaknesses of geography theory. (Gallup, Sachs and Mellinger, 1999) North Korea and South Korea have temperate climate with good access to the sea which those factors are withheld for fast economic growth. Additionally, North Korea has more natural resources and better geographical location than South Korea. The similar geographical conditions should achieve the similar result of economic outcome theoretically. After the economic development from 1950 to 200, the income level in South Korea is about 16 folds than North Korea in 2000. (Acemoglu, Johnson and Robinson, 2002)

For the example of Hong Kong, it is located at tropical area that is withheld for agriculture productivity. (Gallup, Sachs and Mellinger, 1999) It should be suffered from slow economic growth, but it is a developed city now. The growth trends for those exceptional cases are not
consistent to the theory. The long term divergence of economic growth could not explain by geography theory solely. (Acemoglu, Johnson and Robinson, 2002)

II: Institutional theory

Institution refers to the rules or structures in a society which constraint and shape human behaviors. (North, 1990) Institutions are determined by endogenous variables within the economy such as the collective choices, political power of the society and geographical factors. The institution theory implies differences in institution cause different long-run comparative growth. (Acemoglu, Johnson and Robinson, 2004)

Institution theory can be divided into three parts, they are economic, culture and political. Economic institution plays a crucial role in determining the economic incentive, thus shapes economic outcomes. For example, the secure of property right is the most direct way to ensure the efficient use of resources. (Acemoglu, Johnson and Robinson, 2004) The efficient allocation of resource can achieve highest economic outcome which leads to rapid economic growth. For the political institution, it determines the distribution of political power and the resource allocation. Political power would directly affect the growth and development routes of an economy. Because the group with greater political power can choose the set of economic institutions for themselves no matter they can achieve the greatest economic growth or not. In culture aspect, religions and beliefs are the typical examples that might cause a difference in growth for an economy. For example, the protestant encourages people to save more, this might lead to higher potential economic growth. (Acemoglu, Johnson and Robinson, 2005)

The First Great Divergence in Europe during the Middle Age is a typical example to illustrate the mechanisms of institution theory. The institution approach can also explain the growth and income divergence between Western Europe and Asia and Eastern Europe. After 1500, the urbanization level in Western Europe experienced faster growth than Asia and Eastern Europe. The fundamental institutional change is the main cause of economic growth in Western Europe. Take Britain as an example, it was not ruled by absolutist initial political institution at that time. Therefore, institutional reform is more likely to take place earlier
than the countries with absolutist regimes such as Spain and France. The political power shifted from monarchy to merchants which lead to reform of economic institution. Importantly, the reform removed the barriers to enter the profitable trade businesses and protected the property rights thus the merchants had higher incentive to invest in different growth opportunities. (Acemoglu, Johnson and Robinson, 2004). As they invested more, the greater returns from investment thus leads to sustained economic growth.

Evaluation:

Institution theory is good at predict and explain the divergence in the long run development trend. In general, the countries with “good” institution usually have the better economic development than other countries. (Alesina and Perotti,1995) In addition, there is strong positive correlation between property right and economic performance. (Lorenzo,2013) It can be demonstrated by International Property Right Index (IPRI). The average national GDP per capita of top quintile IPRI nations is $38,288, and the fifth quintile is $5,545. Also, the nations with high IPRI are the most developed countries such as Finland, New Zealand, Sweden and Norway. Those countries have developed secure property right for a long time, so the long run growth and development are foreseeable.

Moreover, institution theory can compensate the weaknesses of geography theory in explaining the growth pattern. The different economic performance of North Korea and South Korea with almost identical geographical features can be explained by institution differences. (Acemoglu, Johnson and Robinson, 2004) After 1950, North Korea followed the Soviet socialism which focuses on eliminating the private property right system of land and capital. Also, the political power was concentrated on the leader which concerned about their interest rather than population benefits. At the same time, South Korea adopted an opposite approach of the North which is maintaining the property right system and fair access to economic resources. (Acemoglu, Johnson and Robinson, 2004) As a result, the communist North Korea is one of the poorest and less developed countries while market-oriented South Korea is one of the most developed countries now.
In addition, the reversal of growth patterns of some countries can only be explained by institutional approach. The European colonialism changed the economic institutions in some countries. Thus, the different economic institutions contributed remarkable impacts on those countries. (Acemoglu, Johnson and Robinson, 2000) The institutions in European colonization can be classified in two categories, extractive and progressive institutions. The extractive institution discourages economic growth but progressive institution does. The European nations were likely to introduce extractive institution on the relatively rich regions and place with high mortality rate. The most extreme extraction was Belgium in the Congo. The tax rates on Africans Belgian Congo are about 60% of the personal income during 1920 to 1930. The extractive institutions are destructive to economic progress and hinder economic development. (Acemoglu, Johnson and Robinson, 2000)

In contrast, the European nation set up progressive institutions in North America, New Zealand and Australia thus boosted the growth for them. Because they are the majority of the population in those countries, it provided a strong incentive for them to introduce progressive institution in order to protect their property rights. (Acemoglu, Johnson and Robinson, 2000)

Overall, the extractive institution contributes negative effects on economic growth, but progressive institution provides incentive for economic development. Therefore, the different long run economic outcomes can be explained by different institution.

However, the institution hypothesis itself might not able to interpret the initial institution of an economy. The choice of the institution is determined by some endogenous conditions like political, historical and geographical factors which are not clearly included by the model. In addition, it is hard to identify the relevant variables that would lead to change in the institution. Therefore, it is difficult to predict the starting period of the developing countries to reach fast economic growth and evolve to developed countries in the long run.

IV: cross-model comparisons
In my opinion, the institutional theory would be most practical and applicable theory in explaining the differences in the long run development.

First, the importance of geographical factors to determine growth is lower than institutional factors under the current situation. The geographical conditions of the countries mainly decide the early stage of economic development. After the industrialization and technological improvement, the significance of geographical factors has been decreased. For example, the landlocked countries can use air transport to overcome the negative effects from low accessibility to sea. However, the economic incentive from secure property right and stable political institution would have little impact by the rapid changing environment. In certain aspects, the changing conditions could amplify the positive economic effects from institutional factors. Therefore, the significance of the institutional theory is greater than the geography theory at this stage.

Secondly, geography theory asserted withholds geographical conditions usually bring positive economic outcomes. This assertion requires holding other factors constant, even the factors are relevant to the economic growth analysis such as institutional factors. Therefore, the explanatory power of geography hypothesis would be limited by those constraints. In contrast, the institutional theory can still function properly while including the geographical factors to explain economic growth. The divergence of development between North and South Korea is one of the classical examples to illustrate this.

The nature of growth theory and institutional theory is not the same. For the growth theory, the sources of growth like innovation, capital accumulation and technological externalities are growth, but not the origins of growth. It suggests “how to growth” and “What are the mechanisms of factor accumulation”. On the contrary, institution provided the causes of growth, and they are more likely to be the fundamental explanation of comparative growth. (Acemoglu, Johnson and Robinson, 2004) The growth theory is more descriptive on growth, but the institutional theory is more focus on the explanation of the causes. Thus, institutional theory has more direct and clearer expression to point out the explanations on different long run development than growth theory.

Additionally, the prediction of long run conditional convergence in growth theory can also be derived by institutional theory. When the countries are adopting the same
demonstrate the prediction in the long run growth of the countries. Besides, it is supported by a wide range of empirical evidence and previous studies. (Barro, Mankiw & Sala-i-Martin, 1995) The accurate long run convergence hypothesis prediction can be derived by growth theory instead of geography and institutional theories directly. The growth of OECD countries is a strong example to demonstrate the long run convergence of the growth model. The OECD had experienced rapid growth in the past 50 years. For example, the dispersion of GDP across European regions has been decreased from 0.29 to 0.19 during 1950 to 1985. (Barro, 1991) Besides, according to (Sala-i-martin, 1994), the dispersion of the log of per capita personal income for 48 U.S. states has been declined from 0.54 in 1880 to 0.19 in 1988. Those economies are converging at about 2% annually. The above results can show the trend of long run convergence in income within and across countries convergence.

The growth model has provided the concept of sources of growth. (Romer, 1989) The exogenous and endogenous variables are both covered by the growth theory. Therefore, the more detailed explanations and predictions can be derived by the growth theory. Under the globalization trend, the importance of technology towards growth is increasing. The technology improvement might reduce the negative impacts on growth by geographical disadvantages. For example, the generalization of air transport has significantly reduced the geographical advantage of access to sea because sea transport is not the only efficient way to promote international trade. Therefore, the growth theory is more applicable than geography theory in certain extents.

Because the growth model can mainly express the growth in terms of GDP per capita, this might not able to account for the development level in a broad sense. For example, the development components like living environment, general education level and the income inequality might not be reflected by the growth model. Nevertheless, the magnitude of the variables is uncertain on the growth model because they could be easily altered by some external forces such as the government intervention and business cycle. (Dinopoulos, 2006) Thus, the long run growth predictions require adjustments when there are some external changes. Comparing to the geography and institutional theories, the growth theory has more constraints on its growth analysis.

III: the growth theory
The growth model is one of the famous modern growth models in explaining long run development of the countries. It can be divided into two sub-models, exogenous or endogenous growth model.

The Solow model (Solow, 1956) is the model which based on the exogenous changes in the saving rate and population growth rate to determine the long run equilibrium. This model follows the assumptions of decreasing returns to scale in the production of per capita GDP and the growth factors are exogenous. Under the steady state equilibrium, the GDP and population will grow at the same rate. More importantly, it predicts that the convergence of income will necessary emerge in the long run. This implies that the poor regions and countries will growth faster than the rich countries thus close up the growth differences. This is known as conditional convergence and unconditional convergence. The conditional convergence has been supported by a wide range of empirical examples, but the unconditional convergence had been refuted by the empirical evidence. (Barro, 1991).

On the other hand, the endogenous growth model is based on the endogenous variables to explain the long run growth. The sources of growth are technical progress, network effect and returns to aggregate capital stock. Assuming the diminishing returns of physical capital and increasing returns of human capital, the above sources of growth could generate sustained economic growth endogenously. (Romer, 1986) Moreover, the technological change is the core of economic growth as it generates continued capital accumulation. (Romer, 1989) Assuming the nature of technological changes cannot be perfectly patented, the creation and changes of new technologies by one firm tends to have positive external effect on the production of other similar firms. This will increase the return of the production as the production function is positively correlated to stock of knowledge and technology. Therefore, it could increase the marginal product of the whole industry. (Romer, 1994) The other sources of growth like spillover effect and network effect are followed by the similar mechanism. In general, the endogenous growth model has suggested the same prediction as the neoclassical theory in the long run growth convergence by endogenous factors.

Evaluation:

Although the growth model is simple, it is a useful starting point to ithhol the growth of the economies. (Solow, 1956) It conveys the idea of growth by mathematical expressions.
Therefore, it can derive testable implications and easy to economic and political institution, the growth rate should be the same in the long run. The only small difference of income in the long run should be caused by the initial productivity differences. The long run convergence of growth between OECD countries can be explained by the similar economic and political institution in those countries. Conversely, the countries adopted different institutions should cause divergence in the long run. The long run outcomes of the growth model can also be predicted by institutional theory similarly.

From the above cross-model comparisons, the institutional theory can make the same conclusion as geography and growth model predicted in the long run. However, those models might not possible to derive the same useful conclusions as institutional theory. As a result, the institutional theory is more applicable in current and future stages of economic development.

V: Conclusion:

This essay has assessed three different types of development theories by finding out their strengths and weaknesses. Afterwards, the cross-model comparisons indicated that the overall performance of the institutional theory is better than the others. The next step of the research on institutional theory is to focus on “how to improve its weaknesses” and “how to enrich its theoretical framework” in order to explain further about future development trend.
Bibliography:


How do migrants impact the performance of teams in the English Premier League: does the composition of migrants have an effect?

Ryan Fletcher
Labour Economics

Introduction

With 503,000 people immigrating to the UK in the year ending June 2013 (Office for National Statistics, 2013), migration is a much discussed topic in the UK economy. Moreover, recent years have seen a significant rise in globalisation, resulting in firms becoming more universal (in the sense of employing a more culturally diverse workforce). Kahane et al. (2013) carried out a study of workforce diversity, using data from the National Hockey League, to see if foreign players had an impact on their team’s success. With foreign players being a current talking point in English professional football this study will be of similar nature to that of Kahane et al.’s, instead, however, using data from the English Premier League (EPL) to test the impact of migrant footballers on their respective team’s success.

My initial prediction would be that a large number of different nationalities could present an issue due to language and cultural differences. Yet a smaller number could be beneficial due to complementary factors as discussed in Lazear 1999a, 1999b, which is explored in more depth later in this paper.

Background to Migration in Professional Football

In 1995, the introduction of the Bosman rule and the abolishment of the three-foreigner rule allowed clubs to recruit players from other countries to a greater extent than before. Likewise, it gave players the opportunity to apply their trade in other countries, thus resulting in a substantial increase in labour mobility. More recently, the presence of foreign players in the EPL has risen further. In 1999, according to Dobson and Goddard (2001), there were 185 players from outside the UK and Republic of Ireland playing in the EPL, whereas

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1 The Bosman rule allows players freedom of movement within the EU between clubs once they are out-of-contract. It was named after Jean-Marc Bosman as he sued his club as they had offered him a contract with inferior terms to his previous one, which he rejected, and then denied him permission to join another club. His case was taken to the European Court of Justice, where he won, and with that, the three-foreigner rule was dissolved. See Dobson and Goddard (2001).
today, EPL clubs employ 359 foreign players. During this time, the overall number of players in the league has actually reduced from 604 in 1999 to 527 today. Therefore, the proportion of foreign players in the EPL has risen dramatically; the freedom of mobility via the Bosman rule and the abolishment of the three-foreigner rule, along with fewer restrictions on labour mobility within the EU have allowed professional footballers to cross borders with relatively low migration costs.

The Migration Decision

This section will explain some of the underlying theories as to why workers decide to migrate, whether it is nationally or internationally. A well-known theory on this subject is “The Roy Model”. Borjas (1987) explains how income distribution and returns to human capital are linked with migration in his paper: ‘Self-selection and the Earnings of Immigrants’. He suggests that the rate of return to human capital is important in determining what type of workers migrate or not; skilled or unskilled. A country’s approach to rewarding skilled workers and insuring unskilled workers is what can make up the mind of a potential migrant. A highly skilled migrant that feels he/she is being under-rewarded may migrate to a country that offers a higher rate of return to human capital; this is positive selection. Conversely, a low-skilled worker may migrate to a country where they feel they are more insured against poor labour market outcomes than in their home country; this is negative selection. If it is assumed that there are no initial migration costs, then the immigration flow would look like this:

![Figure 1. The Roy Model of self-selection. Source: Borjas (2013)  
2 According to www.transfermarkt.co.uk](attachment:image.png)
Figure 1 shows positive self-selection (left) and negative self-selection (right). It is clear that for positive selection, the destination country pays higher wages than the source country after point SP (a certain amount of skill; be it years of education, or talent for example). A worker would move from the source country to the destination country if they exceed this point of skills as the destination country bears higher returns to skill. The situation is the opposite for negative selection: the worker would move to the destination country if they are below the certain point of skill (SN), as this country compensates low skilled workers, for example, by having a more generous welfare system, or by presenting a lower tax burden (Borjas, 2013).

Family can also be an integral part of the migration decision due to what Mincer (1978) describes as “ties”. If the net family gain is positive, they will move. Even if one member of the family has a better employment outcome by not migrating, they go with the family as “tied mover” Likewise, someone can be a “tied stayer”, when they believe their employment opportunities are better in the destination country, but opt not to migrate as it does not outweigh the losses for the other family member(s), creating a net family loss. This study may be relevant in the professional football industry too; the high wages in this industry may result in substantial income improvements for the player, resulting in net family gains. This study may be relevant in the professional football industry too; the high wages in this industry may result in substantial income improvements for the player, resulting in net family gains. 

Additionally, migration decisions may be made with the help of friends or relatives in the form of social networks. Having previously migrated, these friends or relatives may be able to provide employment information from the destination country to the potential migrant, and refer them to their employer, increasing the job prospects of the potential migrant (Montgomery, 1991; Munshi, 2003). Montgomery (1991) suggests employers use this as a way of applicant screening, especially as they believe the current employee will only refer a capable and well-qualified friend or family member as their reputation is at stake. Furthermore, Munshi (2003) explained how the social networks can create pressure for the potential migrant; for example he studied Mexican immigrants in the USA and concluded that current Mexican migrants are encouraged to follow their community members who have previously moved to the USA. These social ties are recurrent, which can put added

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3 See Mincer (1978) for his study on married couples and a more detailed explanation of net family gains, tied movers and tied stayers.
4 See also Sandell (1977)
pressure on members of the community to continue the migration pattern and remain in the low-level jobs that are presented to them. Social networks in professional football may exist due to players of the same nationality being recommended by existing team members. Additionally, a manager of the same nationality may enhance the network.

**The Impact of Migration**

The impact immigrants have can be ambiguous. This is because immigrants can be substitutes for native workers, (i.e. they possess the same skills and compete for the same jobs as natives) or they are complementary to natives. This means that they allow native workers to specialise in certain jobs as they can more efficiently use their human capital, resulting in increased native productivity (Borjas, 2013). Figure 2 shows this concept diagrammatically.

![Graph showing the impact of migration](image)

**Figure 2. Source Borjas (2013)**

On the left hand side of Figure 2, immigrants are complements to native workers resulting in an outward shift in the demand curve. Wages increase from W0 to W1 and employment for natives increases from N0 to N1.
The right hand side shows a shift rightwards of the labour supply curve. This represents the native workers plus immigrant workers, which results in a decrease in the wage from W0 to W1 and an overall employment increase from N0 to E1, however, native employment falls to N1.

A key question to be looked at is whether immigrants are in fact a substitute for native workers, or whether the complementary factors do increase labour productivity of natives. It is suggested that there can be costs incurred by bringing together a workforce that has different cultures, languages and legal systems (Lazear, 1999b) however, firms must feel that complementary factors do exist, to an extent to which these costs are offset. This can be emphasised when the immigrants are different from the “stock” of native workers (Borjas, 1995; Lazear, 1999b). A study carried out by Ottaviano and Peri (2005) provided evidence that “a more multicultural urban environment makes US-born citizens more productive” (p39). Their results showed that higher wages and rents for US citizens living in metropolitan areas were highly correlated with higher diversity. The reasons that they provide are simple: a taste for variety. They suggest that other cultures provide services that US citizens cannot provide, and this improves overall production. To relate this to the professional football industry, overseas players may bring with them a style of individual play that native players cannot supply, due to the way they were taught as a youngster, for example.

It is important, also, to discuss the drawbacks to a culturally diverse workforce. Firstly, language difficulties can cause communication problems amongst a workforce. Lazear (1999a) describes how minorities joining a group can bring about a new equilibrium, which is not an improvement on the former equilibrium, yet this transition does incur costs. The EPL has, over the years, had more and more foreign players apply their trade in it, and therefore some teams may be experiencing this idea of no improvement in productivity, but incurring the transition costs. Data in this study, which will be presented in the next section, will look to gain an insight into whether these overseas players do have an impact on productivity. Furthermore, the number of different nationalities is important, as the more different cultures and/or languages, would result in higher transition costs. Additionally, a study carried out by Hamilton et al. (2003) concludes that more heterogeneous teams perform better. High-ability team members can raise overall team productivity (which gives reason to why many football teams pay large amounts of money to buy the best players, whether they
be from overseas or not), however, they suggest that social and collaborative skills are instrumental in the mutual learning that is required for the increased productivity. A more homogenous team (i.e. one with more cultures) may not see the benefits from this mutual learning due to a lack of social and collaborative skills because of cultural and language barriers.

Another way to determine the impact of migrants is to measure the overall impact they have on the economy. Standard economic theory suggests immigration can have a positive effect on the economy by raising national income. Figure 3 shows what is known as the “immigration surplus”.

Prior to immigration, national income is given by the area $ABN_0$. After immigration, however, labour supply shifts out to $S'$, putting downward pressure on wages reducing them to $W_1$ and increasing employment to $M$. Area $FCMN$ represents the total amount of wage paid to the immigrants and the new national income is given by $ACM_0$. Lastly, the immigration surplus is the triangle $BCF$, and this arises because immigrants increase national income by more than what they cost to employ (Borjas, 2013). Therefore, overseas professional footballers entering the EPL may be providing macroeconomic benefits to the UK economy.

Figure 3. Source: Borjas (2013)
Data/Findings

Table 1 shows the descriptive statistics, as well as the sources of the data used in this study. The data was observed for four 38-match seasons from 2008/09 to 2011/12.

The Model

The model used to test for the effects of migration used team performance as the dependent variable, with workforce diversity as the focus explanatory variable\(^5\). Additionally, the average age of the team and a team quality ratio (which was the relative wage bill) were added as control variables.

Firstly, the dependent variable, team productivity, was measured by the win percentage of each team and the percentage of points gained by each team, which is standard in sports literature. Point percentage is used to assist to capture the effect of draws: in the EPL, a team is awarded three points for a win, one point for a draw, and no points for a loss.

<table>
<thead>
<tr>
<th>Descriptive Statistics</th>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
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<tbody>
<tr>
<td>Points %</td>
<td>80</td>
<td>16.6666666667</td>
<td>78.9473684211</td>
<td>45.5482456140</td>
<td>14.6309067182</td>
</tr>
<tr>
<td>Win %</td>
<td>80</td>
<td>13.18</td>
<td>73.68</td>
<td>37.0069</td>
<td>15.28851</td>
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<tr>
<td>Team Quality Measure</td>
<td>78</td>
<td>22372</td>
<td>201789</td>
<td>74955.60</td>
<td>44626.321</td>
</tr>
<tr>
<td>Team Quality Ratio</td>
<td>78</td>
<td>0.30211292298</td>
<td>2.51779583864</td>
<td>1.00000000000</td>
<td>0.58163755035</td>
</tr>
<tr>
<td>Average Age</td>
<td>80</td>
<td>23.29</td>
<td>29.90</td>
<td>26.5579</td>
<td>1.30667</td>
</tr>
<tr>
<td>Total no. of players</td>
<td>80</td>
<td>17</td>
<td>27</td>
<td>20.94</td>
<td>1.912</td>
</tr>
<tr>
<td>Different nationalities</td>
<td>80</td>
<td>5</td>
<td>17</td>
<td>11.00</td>
<td>2.619</td>
</tr>
<tr>
<td>UK</td>
<td>80</td>
<td>2</td>
<td>19</td>
<td>10.20</td>
<td>3.966</td>
</tr>
<tr>
<td>Africa</td>
<td>80</td>
<td>0</td>
<td>9</td>
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</tr>
<tr>
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<td>4.15</td>
<td>2.581</td>
</tr>
<tr>
<td>Eastern Europe</td>
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<td>4</td>
<td>1.55</td>
<td>1.135</td>
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<tr>
<td>America</td>
<td>80</td>
<td>0</td>
<td>7</td>
<td>2.36</td>
<td>1.528</td>
</tr>
</tbody>
</table>

\(^5\) This model used in Kahane et al. (2013) is key inspiration for this study
Next, to determine workforce diversity, players were sorted into six groups of nationalities: UK (including Republic of Ireland), Western Europe, Eastern Europe, Africa, Australasia and America (including North, Central and South). Players’ nationalities were determined by the national team they choose to represent, as opposed to birthplace\(^6\). Further, the Herfindahl-Hirschman index (HHI) was calculated by summing the squares of the shares of each nationality group, to capture their concentrations. Additionally, the relative shares of these nationality groups were calculated.

Lastly, the team quality ratio was the relative wage bill of each team for each season. The assumption was that the higher the relative wage bill, the more successful the team should be as they are paid a higher wage.

Second, the average age of the squad was used as another control variable. The assumption was that a squad that was too young or too old may have a negative impact on team productivity.

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\(^6\) As in Kahane et al.’s study

Results

Table 2 shows the results across all specifications. The quality ratio was, as expected, dominant in determining both win percentage and points percentage and was significant at the 1% level. This means, therefore, that if the wage bill is doubled (a unit increase in the quality ratio variable) then the percentage of points gained in a season increased by between 18.514% and 18.928%.

Next, across all specifications with point percentage as the dependent variable, the sign for the coefficient associated with average age was negative. Yet, for all specifications with win percentage as the dependent variable, the sign for these coefficients was positive. All of these coefficients, however, were statistically insignificant and so the data observed shows no evidence that the average age of the team has an impact on productivity.

Moving on to the focus variables; all nationality group variables, including the relative share variables, were insignificant in all specifications. This is possibly due to the unavailability of individual wage data, so different groups could not be weighted according to their relative wage. Furthermore, the HHI coefficients were insignificant across all specifications. Next, the number of different nationalities variable was significant to the 10% level in four specifications; the results showed that the number of different nationalities had a significantly negative relationship with team productivity. If the number of different nationalities in the team increased by 1, then points gained in a season would fall by

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7 See Appendix for full regression analysis
8 A study testing the average age as a non-linear variable may be a topic of further research
<table>
<thead>
<tr>
<th>Variables</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relative Wage Bill</td>
<td>(2.359)</td>
<td>(2.320)</td>
<td>(2.351)</td>
<td>(2.381)</td>
<td>(2.204)</td>
<td>(2.162)</td>
<td>(2.194)</td>
<td>(2.227)</td>
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<tr>
<td>Average Age</td>
<td>0.019</td>
<td>0.110</td>
<td>0.66</td>
<td>-0.031</td>
<td>-0.118</td>
<td>-0.027</td>
<td>-0.049</td>
<td>-0.152</td>
</tr>
<tr>
<td></td>
<td>(0.851)</td>
<td>(0.844)</td>
<td>(0.854)</td>
<td>(0.858)</td>
<td>(0.794)</td>
<td>(0.786)</td>
<td>(0.797)</td>
<td>(0.802)</td>
</tr>
<tr>
<td>No. of Different Nationalities</td>
<td>-1.699*</td>
<td>-1.824*</td>
<td>-3.683</td>
<td>-4.160</td>
<td>-1.648*</td>
<td>-1.809*</td>
<td>-2.710</td>
<td>-3.343</td>
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<tr>
<td></td>
<td>(0.984)</td>
<td>(0.970)</td>
<td>(3.957)</td>
<td>(3.940)</td>
<td>(0.919)</td>
<td>(0.904)</td>
<td>(3.693)</td>
<td>(3.685)</td>
</tr>
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<td>0.040</td>
<td>0.074</td>
<td></td>
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Table 2. Regressions ran using SPSS.
between 1.648% and 1.809%. Likewise, the win percentage would fall between 1.699% and 1.824%. This reflects the costs that can be incurred through a diverse workforce (Lazear, 1999a, 1999b; Hamilton et al., 2013). However, when the different nationality squared term was introduced, in an attempt to capture a non-linear relationship, the coefficients were insignificant. The signs for the different nationality and squared different nationality variables were negative and positive, respectively, suggesting a non-linear relationship. Yet these variables were not statistically significantly different from zero.

Discussion

The main objective of this study was to observe the impact of migrants in the EPL. A crucial element of the theory of the impact of migration is whether immigrants are complements or substitutes for native workers. Currently, many professional footballers, former professional players, managers and members of footballing governing bodies are debating the effect foreign players have in the league. It is thought that by having too many foreign players, the opportunities of British (with focus on English) players are hindered, which is having a negative impact on the national team. Whether this notion is reflected in wages or in the number of British professional players in the EPL is perhaps a potential topic for further research. This study sought to test the impact of immigrants, with emphasis on how the composition affected team performance. The data suggested that a larger number of different nationalities within a team can impact negatively on team success, suggesting that more heterogeneous teams are more successful and culture and language barriers do hinder team performance, reflecting Hamilton et al.’s (2013) study. However, when a squared term of the different nationalities variable was added, the coefficients associated became statistically insignificant, rendering the outcome somewhat inconclusive. A larger data sample, covering more seasons, may have seen the number of different nationalities have a more robust significance. A possible reason for the lack of robustness could be due the fact the market for foreign players in the EPL has matured. That is, as the number of foreign players has been high for a number of years now, the workforce equilibrium has shifted to a more diverse one. If, perhaps, the study was performed during an earlier period when the market was not as mature, nationality variables as well as the number of different nationalities may have had a significant and robust impact.
Moreover, to analyse whether or not the foreign players in the EPL complement native players is an ambiguous concept. Although the coefficients were insignificant when the squared term of different nationalities was introduced, the signs for the two variables were different\(^1\), which suggested that the number of different nationalities has a negative relationship with team success up to a certain point, where it becomes a positive relationship. This contradicted the idea that a small number of different nationalities may complement the workforce; instead it suggested that once there was a certain amount different nationalities in the team, each extra nationality would have a positive impact. A possible reason for this is that it requires a certain number of nationalities within a team for them to become complementary to one another, and below this number, they are substitutes. As suggested by Lazear (1999a), teams may incur transition costs via migration that does not improve its equilibrium productivity. This could be another opportunity for future study; again, using an earlier and larger data set may capture the labour market for foreign players at a time when it was less mature, and the insignificant relationship found in this study may prove to be significant. These potential results would then agree with literature suggesting native workers benefit from more diverse workforce (Ottaviani and Peri, 2005; Lazear 1999b).

The existence of social networks would perhaps need data collected over a longer period of time, in order to assess any herding behaviour as suggested by Munshi (2003). However, this data does show signs that social networks do exist in professional football. An example is Arsenal FC: the data shows that for three of the four seasons observed, Arsenal had a league high of six French players, as well as a French manager. This perhaps shows signs of a social network. These players may have had links as they were growing up and learning their trade; played together in France at various stages of their lives; or played together internationally and once one or two were at Arsenal, others followed, whether it be via referrals as suggested Montgomery (1991) or whether the remaining players actively sought a move to there. This information is beyond the scope of the data collected in this study, thus this can only be speculation, however, this may be potential evidence of a social network in professional football.

As previously stated, the Roy Model is a key theory behind the migration decision. The data collected in this study showed the income distribution across the teams in the EPL, with the

\(^1\) See Table 2
Team Quality Measure variable. However, due to the unavailability of data, it cannot show how the income is distributed within the teams, and so it is unknown how total wage bill is split between nationalities or groups of nationalities. If this data was available, it would enable the observation of how teams value these different (groups of) nationalities. Furthermore, this would allow the Roy Model’s theory to be tested; by knowing how much each player (nationality) was being paid, the Roy Model’s theory of self-selection could be tested by using a cross-country comparison because the returns to human capital (or talent in this case) could be compared.

The data in this study cannot capture any macroeconomic impact immigrants have on the UK’s economy. However, it is important to note the huge success and popularity of the EPL, of which foreign players are an imperative part. The increasing global interest of the EPL has caused revenue to increase to £2.3 billion in 2011/12 from just £170 million in 1991/92 and the tax contributed by English professional football in 2011/12 was £1.3 billion (Deloitte Annual Review of Football Finance, 2013). The EPL has a significant impact on employment, GDP and national and local economies. As previously mentioned, 185 foreign players were employed by EPL teams in 1999; at this time, the revenue of the league was approximately £669 million. With revenue increasing dramatically, so too has the number of foreign players. Without them, would the EPL be as globally popular and as beneficial to the UK economy? An extremely interest topic for further research could be to test the extent to which foreign professional football players create an immigrant surplus, as discussed earlier in this paper.

Conclusion

In conclusion, this study has found some evidence of a negative impact from immigration on team’s success in the EPL. However, the professional football labour market for foreign players may have matured to an extent to which the new equilibrium labour workforce is relatively diverse. The results of this study showed that, as expected, the relative wage bill of each team was dominant in determining the respective team’s productivity, measured by win percentage and percentage of points gained over a 38-game season. An important finding was that for four specifications, the number of different nationalities within a team had a significantly negative relationship with productivity (point percentage and win

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2 See House of Lords Library Note (2013) and Boyce (2011)
3 See Dobson and Goddard (2001)
percentage). If there was one extra different nationality in the team, the team gained 1.648% less points or won 1.699% less games in the season. This shows that cultural differences and language barriers do have an impact on team success, as discussed in Lazear (1999a, 1999b). However, these results are not robust. The impact of the composition of migrants in a team is not shown in this data sample; no one group of nationality has proved to significantly have a positive (or negative) impact on team productivity, nor has the relative share of these groups. There is some evidence for the existence of social networks, largely from Arsenal – as a possible French network may exist within the team. Lastly, due to the limitations of the data available, it is impossible to say whether foreign players enter the league due to positive self-selection as predicted in the Roy Model.
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We can learn more from an experiment on behavioural choice between simple and compound lotteries than we can learn from an experiment on asset markets.

Marvin Deversi
Experimental Economics I

Abstract
In this essay I compare two experimental approaches on financial decision making – namely, experiments on the choice between simple and compound lotteries and experiments on asset markets. Based on behavioural finance literature, I argue that we learn more from the former about individual choice behaviour with assets and more from the latter about how to explain real world financial data.

Keywords: experimental asset market, lottery choice, probability compounding task.

1 Introduction
Both analyses on individual investment behaviour and on asset market outcomes traditionally assume rational agents. Here, agents individually process new information according to Bayes’ rule and make decisions in line with the axioms of Subjective Expected Utility Theory (Barberis and Thaler, 2003, p.1053). This results in an efficient outcome, i.e. that for example actual asset prices reflect their fundamental values (Fama, 1970, p. 383). However, a large body of literature shows deviations from this traditional paradigm, both in an individual (e.g. use of heuristics, see Kahneman and Tversky, 1983) and in a market dimension (e.g. emergence of bubbles, see Smith et al., 1988). A relatively new economic approach to take these observations into account is behavioural finance. Developing psychological models which relax the rationality assumption and relating them to financial markets is the underlying idea (Shiller, 2003, p. 90). Doing so, irrationalities in forming beliefs, in people’s preferences, or decision making are frequently observed in laboratory experiments (Barberis and Thaler, 2003, p. 1054).

This essay discusses two approaches in the light of behavioural finance literature. Namely, experiments on the choice between simple and compound lotteries and experiments on asset markets. The reminder of this essay is structured as follows: I explain the approaches
and point out which information can be obtained, firstly. Then I compare both and discuss their opportunities to reach a concluding statement towards the proposition in the heading.

2 What can we learn from choices between simple and compound lotteries?
Assume two binary lotteries $X$ and $Y$, both having either a success ($SX, SY$) or a non-success ($NX, NY$) outcome. If $pi > 0$ is the probability of success outcome of a lottery $I$ then $X = (p_X, SX; p^*_X, NX)$ and $Y = (p_Y, SY; p^*_Y, NY)$ represent the simple lotteries, where $^*_pi$ is the complementary probability of the success outcome. A compound lottery ($Z$) can be presented by a weighted ($\alpha, \beta$) combination of simple lotteries. Like $Z = (\alpha X + \beta Y)$, where $\alpha + \beta = 1$. If confronted with a choice between say $X$, $Y$ and $Z$ rational agents know that the probability of winning the compound lottery cannot be higher than the probability of the less probable success outcome of the simple lotteries (Nilsson, 2008, p. 473). This is known as the monotonicity axiom of probabilities. The winning-probability of the compound lottery can be calculated by reducing $Z (pZ = pX \cdot pY)$.

Kahneman and Tversky (1983) document that in verbal compounding tasks (i.e. asking participants to verbally interpret which lottery is more probable – see for example Kahneman and Tversky, 1983, p. 297) subjects neglect these probability laws. This is called the conjunction fallacy. Zizzo et al. (2000) explain that this fallacy may lead to a violation of the monotonicity of preferences and Bayes' rule in decisions under risk. In contrast to Kahneman and Tversky (1983), recent experimental investigations of the conjunction fallacy use behavioural compounding tasks (see Fantino and Savastano, 1996; Zizzo, 2001; Zizzo, 2003). Here, participants make a decision among several simple and compound lotteries (Zizzo, 2003, p. 288). In result the conjunction fallacy committal remains robust above 20% (Zizzo, 2003, p. 289).

Fantino and Savastano (1996) find that training in behavioural compounding tasks affect subjects’ conjunction fallacy committal. Since this study doesn’t differentiate between new and those compounding tasks subjects were already trained on, Zizzo (2001) controls for that. In the practice stage the author faced each participant with 150 decisions between three lotteries. Varying with the treatments 0%, 10% or 20% of those choices were compound lottery tasks. Here, two simple and one compound lottery were offered. Every simple lottery was presented with colour blocks, every compound lottery with stacks of colour blocks associated to the winning probabilities of the lottery components. Feedback
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after each choice was provided in the practice stage only. In the testing stage every subject made 10 choices from which 7 were new compound lottery tasks. The subjects were not informed that they were dealing with compound lotteries. Zizzo (2001) partly confirms Fantino and Savastano (1996), finding that the conjunction fallacy committal reduces with increasing fraction of compounding tasks in the practice stage. Besides, Zizzo (2001) argues that instead of using probability laws subjects ” [...] average out the probabilities of the two events to assess how good the lottery looks like.” (Zizzo, 2001, p.1). Zizzo (2003) adds that decision makers’ behaviour is insensitive to different extents of information about the probability compounding.

Sonsino et al. (2002) investigate behavioural choices between simple and complex lotteries. Hereby the authors provide a methodological approach to measure product complexity using compound lotteries. In the experiment they offer choices between simple and compound lotteries of certain complexity levels to subjects. Sonsino et al. (2002) use a dynamic frame to represent the compound lotteries, so that the compound lotteries are complex in two dimensions – time and components. The used complexity measure equals the product of the possible outcomes and the amount of different periods (simple lottery components). It is argued that due to very high levels of complexity agents decide in a context of ambiguity (Sonsino et al., 2002, 937). The authors found that subjects tend to prefer the simple lottery and name this negative complexity effect. Among other topics this effect is presented as a reason for inefficient asset portfolio selection (Sonsino et al., 2002, 951).

Sitzia and Zizzo (2011) follow this complexity metric. After providing an initial endowment to every subject, the authors offered either one simple lottery (in period 1 and 2) and one compound lottery (in period 3 and 4) or one simple and one compound lottery (in periods 1 to 4) to each subject. The subjects made buying decisions facing randomly generated prices and in result tended to prefer the more complex product. So, Sitzia and Zizzo (2011) find some evidence for a complexity exploitation effect in an individual choice context. However, by introducing the behavioural choice task in a monopolistic market setting this evidence is not robust. Subjects got randomly assigned to be a seller or a buyer. As in the individual choice tasks buyer decided whether to buy a simple/compound lottery (structured as above). Here, the prices were determined by sellers. The results of this posted offer market neither provide evidence for complexity aversion nor for complexity exploitation. Sitzia and Zizzo’s
analyses (2011) raise some questions about the observable demand price trajectory which are deepened in Sitzia and Zizzo (2012). In a posted offer market task with randomized price dynamics they find that the decision environment influenced the preferences of the participants (shaping effects), i.e. that subjects seemed to have no clear preferences over the offered product and thus relied on past price observations.

In sum, those investigations mainly yield to five observations which we keep in mind as key lessons from behavioural compounding tasks: If confronted with a choice between a simple and a compound lottery subjects commit the conjunction fallacy (1). Instead of using probability laws, they use an averaging heuristic to decide (2). Admittedly, the conjunction fallacy committal can be reduced by training but remains robust above 20% (3). There is mixed evidence whether subjects tend to avoid more complex lotteries (4). It seems that subjects’ preferences are influenced by shaping effects (5).

3 What can we learn from experiments on asset markets?
As a distinctive feature, experimental asset markets (EAM) allow for speculative behaviour, i.e. each subject can buy and sell assets (Sunder, 1995, p. 445). The most common approach of hold EAM is the one introduced by Smith et al. (1988). Indeed, there exist alternative approaches which in line with the definition of Noussair and Tucker (2013) can be seen as asset markets. However, because of the huge amount of financial market investigations (Noussair and Tucker, 2013, p. 555) I will concentrate on the Smith et al. framework.

The baseline market as used by Smith et al. (1988) is a single closed book continuous double auction market. All participants are endowed with a certain amount of experimental money and assets. In Smith et al. (1988) these assets could be traded over 15 periods. Every asset holder gets a dividend of each asset in his portfolio which has a positive expected value after every period but a value of zero after the last period. The fundamental value of an asset monotonically declines over the trading periods. All tradings are free from costs and holding money earns no interests. Subjects’ eventual experimental money on account is exchanged in real-world currency units. Palan (2013) summarizes the typical volume and price patterns in Smith et al. asset markets, from now on noted as EAM. The author states that the majority of EAM with inexperienced subjects start with an asset price below its fundamental value. Then a bubble is formed (asset price is above the fundamental value) which in the end

1 For instance Walrasian Auction Markets (see Lugovskyy et al., 2010) or Parimutuel Betting Markets (see Plott et al., 2003)
of the trading phase collapse down to the fundamental (crash). Frequently the crash-period and the following periods are characterized by low trading volumes and the fact that subjects tend to sell their assets rather than buying new ones (Porter and Smith, 2008, p. 248).

Recent literature runs investigations by slightly deviating from this approach to compare the emerging price and volume trajectories to the typical patterns. To present what could be learned from these deviations, I concentrate on examples of three fields of literature which are relevant for the proposition at hand: expectation formation (1), individuals in the lab (2) and institutional elements (3).

Using their individual information set subjects form expectations about future market developments (Sunder, 1995, p. 445f.). So, a main research interest lies in investigating the effects of informational changes and expectation formation (1). Palan (2013) summarizes that price expectations in EAM are formed by extrapolating past prices. Furthermore, those price forecasts have a smaller range than the occurring experimental market data (Palan, 2013, p.574). Kirchler et al. (2012) argue that subjects’ confusion influences mispricing. The authors use a gold mine analogy to frame the market environment differently. That reduced both mispricing and overvaluation of the traded gold. If subjects attended to a comprehension task to clarify the underlying processes in the EAM and if it is public knowledge that every subject attended to this task, bubbles reduce (Cheung et al., 2012, p. 16).

Moreover, the emergence of bubbles in EAM depend on the participants’ characteristics (2). Dufwenberg et al. (2005) state that in markets with mixed experienced traders the bubble-crash pattern changes. In detail, subjects which already attended to trading periods were mixed with totally unexperienced traders. As a result training reduces bubbles. Furthermore, in a 2x2 factorial design Hargreaves-Heap and Zizzo (2011) find that excitement at the begin of the period affects bubble emergence. They also point out that buying (excitement) and selling (anxiety) is connected to emotions. King et al. (1993) run an experiment with corporate executives as participants. The authors confirmed robustness of the experiments with student subjects. So, even with experts irrationalities occur.
Experimental laboratories offer the opportunity to manipulate variables of EAM isolated and precisely. These variations change the underlying processes or features of the market – in other words the institutional setting (3). Kirchler et al. (2012) for instance vary both the asset-to-cash-ratio and the fundamental value process in a 2x2 factorial design. The results show a propensity for mispricing in treatments with declining fundamental value process, while overvaluation tends to occur when a declining fundamental value is combined with an increasing asset-to-cash-ratio. As another example, the second dimension of the factorial design in Hargreaves-Heap and Zizzo (2012) allow for a chat to let the traders communicate during the trading periods. They find no evidence for a general influence due to chatting opportunities.

4 Discussion

Can we compare both methodologies? Zizzo (2003) gives an intuitive answer: “Probability compounding is a pervasive necessity for any economic agent who needs to make decisions under risk and who thinks in terms of probabilities.” (Zizzo, 2003, p. 304). In line with this, representing an investment opportunity in a risky asset as a simple lottery is mostly oversimplified. The outcome of an asset may depend on various circumstances. So, presenting the asset investment as a compound lottery seems to be more adequate. And indeed we can find some similarities. As Zizzo (2011) and Sonsino et al. (2002) argue if people are confronted with very complex compound lotteries they make decisions in an uncertain environment. As it is in EAM (Bossaerts et al., 2010, pp. 1327.f). Furthermore, in both decisions subjects exhibit irrationalities. In EAM this results in mispricing and overvaluation, in a behavioural compounding task the conjunction fallacy occurs. Likewise we can see that training respectively experience in both cases seem to reduce irrationalities.

Did we learn more from behavioural compounding task than from EAM? EAM are frequently used not without a reason. Its’ features balance out real-world financial markets and economic models (Sunder, 1995, p. 491). So, some important findings in field data can be pictured in the laboratory and EAM offer the opportunity to alter variables and institutional features inspired by real-world markets. At the same time double auction markets are considered to be relatively efficient and tend to nipe out irrationalities. Fehr and Falk (1999, pp. 107-108) argue that those markets are one of the most competitive and efficient institutions used in experimental economics. Nevertheless, it is difficult to identify individual preferences since we observe aggregated data only. This data gives information about the
market result of decision behaviour and therefore is less clean regarding individuals’ preferences. Here, the behavioural compounding task experiments have a clear advantage.
We can observe individual decisions with asset-like lotteries showing a preference ordering snapshot (Zizzo, 2003, p. 291). So, if we assume that behavioural compounding experiments give us an insight into what EAM’s blind spot is, these experiments have some advantage.
Subjects trading in EAM decide in a relatively artificial task. Lei et al. (2001) state that subjects trade because they attend to an experiment, are asked to trade and have no other activity to do. Kirchler et al. (2012) show that in EAM some subjects seem to be confused and King et al. (1993) add that even experts are irrational. In contrast, Sitzia and Zizzo (2012) argue that lotteries are new products for all subjects and that subjects don’t get tired trading them. Using lotteries instead of assets may frame the individual decision differently and could make the environment more salient. In general, it is difficult to gage how complex the EAM environment seems to participants. With the complexity metric for compound lotteries presented in Sonsino et al. (2002) one could control for various complexity levels of assets. Eventually, for me Sitzia and Zizzo’s investigations (2012) raise an interesting question: Are subjects affected by shaping effects in EAM? Summing up, I argue that we learned more about individual decision behaviour with assets from behavioural compounding tasks than from EAM. These experiments can be seen as a missing part of the EAM puzzle. But about how to explain real-world financial market data EAM has been more powerful.

Could we learn more from experiments on behavioural compounding tasks? So far, observations about behavioural compounding tasks in a market setting are very little. But Sitzia and Zizzo (2011) explain that rich information about subjects’ preferences can be obtained. One suggestion could be to design an EAM with probability compounding tasks. Comparing the results and benchmarking them to real-world financial data could give further insights. One could observe how prices behave if simple and compound lotteries are traded in multi-asset markets with varying institutional features. What if the expected (fundamental) value of a complex lottery declines over the trading periods? Alternatively, with support of computational economic methods one could integrate the individual decision observations from behavioural compounding tasks into an agent-based financial market model. In sum, further research to exploit behavioural compounding tasks’ full potential is required.

2 Experimenter Demand Effect in terms of Zizzo (2010)
5 Conclusion

In this essay I compared two experimental approaches. Namely, experiments on the choice between simple and compound lotteries and experiments on EAM. I conclude that we learn more from the former about individual choice behaviour with assets and more from the latter about how to explain real-world financial data. Nevertheless, further research on behavioural compounding tasks in market settings could induce me to renew this conclusion.
References


Plausible deniability and its effects on trust-fulfilling in the basic trust game
James Rossington
Experimental Economics II

I. Introduction

This experiment investigates the effects on trust-fulfilling, of introducing “plausible deniability” into the basic trust game via an act of chance which will violate trust on a subject’s behalf with some given probability. In section two, the background of moral “wiggle room” and plausible deniability is given in the context of the Dana, Weber and Kuang (2007) experimental paper and the motivation for this experiment is put forward. Section three explains the precise experimental design and procedures which were used and section four sets out the null and alternative hypotheses on which the analysis will focus. Section five presents the findings from the experiment, both raw statistics and the results from a probit regression on both the decision to trust and the decision to fulfil trust. Finally, section six and seven contain a general discussion of the results and limitations of the study and present some suggestions as to the direction in which future research on this topic could be taken.

II. Background

It is a general finding of Economic experiments that subjects display an apparent concern for others’ welfare, beyond any scope for reputation or reciprocity. This is most starkly observable in the simple dictator game setting, in which past experimenters have found that a majority of subjects will give some positive amount of their endowment, even when it is not in their best interests to do so (Camerer, 2003, chapter 2). Dana, Weber and Kuang (2007), henceforth DWK, consider the idea that generosity in these and in other settings may simply be a desire to appear fair to others, as opposed to an explicit desire for fair outcomes. Whilst many theories of social preference exist which suggest that giving is dependent on the final outcomes of the game itself³, DWK suggest that alternative motives may be at work, which cannot be captured by payoffs alone.

³Some examples of distributional theories of social preference are altruism (Andreoni, 1990), which suggests that subjects may have an increasing utility in the payoffs of others, inequality aversion (Fehr and Schmidt, 1999), which suggest that subjects may be averse to advantageous inequality and utilitarianism and prioritarianism, which suggest that subjects may simply be attempting to maximise the sum total welfare of both players or maximising the payoff of the least well-off player, respectively.
Subjects in the dictator game may actually prefer the selfish outcome of keeping their entire endowment, but wish to maintain an illusion of not being selfish by choosing to act generously regardless. DWK extend this idea further by suggesting that if this is truly the way in which subjects operate, then we could reasonably expect that some individuals will exploit opportunities which allow them to act in a selfish manner, so long as they are provided with a reasonable excuse to do so.

One such example of moral “wiggle room” which allows one to act selfishly without appearing so to others is the existence of uncertainty as to what exactly causes an unfair outcome. This concept known as “plausible deniability”, suggests that subjects may exploit uncertainty as to what ultimately causes an unfair or inequitable outcome, in order to behave in a more self-interested manner. DWK investigate this phenomenon in an experimental setting by introducing a cut-off time to the decision of the dictator in the dictator game. After the cut-off point, if no decision has been made a computer will randomly make a choice on the subject’s behalf. Crucially, only the dictator will ever know if a cut-off occurs, therefore, if the recipient in the dictator game observes an unequal final allocation, they have no way of knowing for certain, whether this outcome was explicitly chosen by the dictator or whether it was simply a product of chance.

DWK suggest that this uncertainty could provide subjects in the dictator game with the moral “wiggle room” in which to act in a more self-interested manner and therefore predict that the level of observed generosity in the dictator game will fall, when the cut-off feature is added. They find a rather striking result: of the 75% of subjects who weren’t cut off by the computer, 55% chose the selfish outcome, compared to just 24% in the baseline dictator game.

One important question remains however: will subjects still exploit moral “wiggle room” in other experimental settings, such as the basic trust game, or is this effect simply a further artefact of the artificial, lab-based environment of the dictator game? This paper reports the results of an experiment which investigates whether trust fulfilling in the basic trust game is a desire for fair outcomes or a desire to maintain an appearance of fairness. More specifically it seeks to investigate whether or not the level of trust fulfilling decreases when plausible deniability is introduced via an act of chance, which chooses selfishly on the subject’s behalf, with a given probability.

III. Experimental Design
The experimental design was the basic trust game as featured in Bacharach et. Al. (2007). This is a simultaneous move trust game in which both players face a set of binary choices: to “trust” or “withhold” trust for the first player (known as the truster) and to “fulfil” or “violate” trust for the second player (known as the trustee).

If the truster chooses to “withhold” their trust, both players earn £0. If the truster decides to trust, both players will receive £3 if the trustee then chooses to fulfil their trust. If the trustee chooses to violate trust, the truster will lose £3 but the trustee will gain £4.50.

The strategy method was employed, meaning that all players in the role of the trustee were required to make their decision before knowing the decision of the truster, acting as if the truster had already chosen to trust them. This allows observations to be gathered for all subjects, even those whose decision as trustee was never taken into account, since the truster chose to withhold trust in the first stage. A mix of between and within-subjects design was also used. To increase the number of observations available for each of the two decisions, every subject made a decision as both the truster and the trustee, with no feedback given until both decisions were made. As the effects of plausible deniability on trust fulfilling is the main focus of this experiment, all subjects were required to make a decision first as the trustee in Task 1 and then immediately afterwards as the truster in Task 2.

All subjects were randomly assigned the role of truster or trustee but this role was only revealed to them after they had taken a decision in both roles. All subjects were randomly matched with another participant in the room who held the opposite role to them; this matching was strictly anonymous and no subject ever knew which other participant in the room that they had been matched with. Whilst the same subject acted in both roles within each treatment, a between-subjects design was used, meaning that each subject only ever faced one of two treatments.
The two experimental treatments are as follows: the baseline treatment which is simply the basic trust game as shown above and the plausible deniability treatment which has one additional feature. Now, when the subject makes a decision as the trustee as to whether or not to fulfil or violate trust, there is a 1 in 3 (33%) probability that an act of chance occurs which chooses to violate trust on their behalf. This probability was public knowledge. Whether or not an act of chance occurs was determined by a private die role for each subject, once they had made their decision as the trustee in Task 1. If the number 1 or 2 was shown on the die, an act of chance occurred.

No subject could ever know whether or not an act of chance would occur and if it did occur, they were powerless to affect its choice of violate. Crucially, only the subject for whom the act of chance occurred would observe this occurrence. This ensured that the subject with which they were matched could not distinguish between the actions of the trustee or of the act of chance if their trust was violated, giving the trustee plausible deniability with which to violate the trust placed upon them. Note, however, that if the truster observed trust fulfilment, it was always a certainty that this was enacted by the trustee, since the act of chance would always choose to violate trust.

This act of chance plays a similar role to the cut-off feature in DWK. Rather than allowing for accidental cut-offs, which in the paper were assumed to be deliberate “self-deceptive” motives for not making an explicit choice, here all subjects are required to make a decision. Whilst subjects cannot guarantee a fair outcome, as in DWK, any subjects with a genuine preference for fair outcomes should continue to choose to fulfil trust, regardless of the presence of the act of chance.

Four sessions were run, two for each treatment, on the 18th March and the 24th March at the University of East Anglia. Subjects were a mixture of undergraduate and postgraduate students at the university and were recruited on a voluntary basis via university email (please see appendix A). All Instructions were given as a hard copy to each participant and read aloud by the experimenter, with short questionnaires being administered at suitable points to check understanding. A copy of the instructions and questionnaires can be found in Appendix B.

After the first two sessions were run, initial results suggested that there was no significant difference in the levels of trust fulfilling between session 1 and session 2 ($\chi^2=0.000$, $p=0.500$ (2-tailed)) but that there was a significant increase in the number of subjects choosing to
withhold their trust ($\chi^2=2.3449$, p=0.063 (1-tailed)). One interesting possibility was that the introduction of the *act of chance* may have altered the beliefs of subjects as to how other participants are likely to behave. With this in mind, session 3 and 4 included a brief belief elicitation task which took place immediately after the truster and trustee decision and before any feedback was given. Subjects were asked to guess, how many of the subjects in the room, including themselves, they thought had chosen to violate trust in Task 1 and how many had chosen to fulfil trust (See Appendix 3 for full instructions).

Payments were determined as follows. Subjects were given an initial credit of £4 to be used in Task 1 and Task 2, meaning all payoffs or losses from their decisions were in addition to this amount. After completing both tasks, each subject had a remaining credit which was the outcome of either Task 1 or Task 2, depending on their role. Each subject then privately drew one of two slips of paper marked “show-up fee” or “decision task” to determine whether they received their remaining credit from one of the decision tasks as payment or simply a £1 show-up fee. Additionally, subjects earned £1 from the belief task for guessing the exact proportion of subjects choosing to fulfil/violate trust and 50p for coming within 1 of the correct answer. Average earnings were £2.99, with a minimum of £1 and a maximum of £8.50. Each session lasted approximately 25 mins.

**IV. Hypotheses**

The null hypothesis would predict that there will be no difference in levels of trusting and trust-fulfilling between the baseline treatment and the plausible deniability treatment. The *act of chance* should have no effect on the levels of trust-fulfilling and should be irrelevant to subjects when making their decision. An alternative hypothesis, following the lines of DWK, would suggest that the *act of chance* will provide subjects with the moral “wiggle room” in which to act in a more self-interested manner and so the level of trust-fulfilling in the plausible deniability treatment should be lower than that in the baseline. Some subjects may choose to exploit uncertainty as to what exactly will cause a violation of trust in this setting, to violate trust more often themselves.

Any changes in the level of trusting should largely mirror those of trust-fulfilling, since any subject who chooses to violate trust in Task 1, can reasonably be expected to withhold their trust in Task 2. Another alternative could be that there is an effect on the level of trusting
independent of changes to the level of trust-fulfilling. Trusters may recognise that the act of chance will provide plausible deniability for trustees and anticipate a higher level of trust violation, even if this ultimately does not occur. This would be demonstrated in the belief elicitation task by a difference in the stated beliefs of subjects in the baseline and plausible deniability treatment.

V. Results

The raw experimental data provide some idea as to which hypotheses are likely to be more convincing. As shown in figure 2, in the baseline treatment 14 of the 20 subjects (70%) chose to fulfil trust in Task 2, whilst the remaining 6 subjects (30%) chose to violate trust. In the plausible deniability treatment, the number of subjects choosing to fulfil trust fell to 50%, with the remaining 50% of subjects choosing to violate trust.

![Figure 2 - Proportion of Subjects Choosing to Fulfil or Violate Trust, Baseline vs. Plausible Deniability Treatments](image)

The data for the decision of whether or not to trust or withhold trust is shown in figure 3. In the baseline treatment 12 of the 20 subjects (60%) chose to trust the person with which they were matched, whilst the remaining 8 subjects (40%) chose to withhold their trust. The level of trusting fell in the plausible deniability treatment to just 28%, with 13 of the 18 subjects (72%) choosing to withhold their trust.
Changes in trusting behaviour appear to mirror those of trust-fulfilling behaviour as would be expected. It is interesting to note however, that the average belief as to the proportion of subjects who would violate trust in Task 1 rose from 35% in the baseline treatment to 50% in the plausible deniability treatment, possibly providing a reason for why the change in the level of trusting behaviour is much larger than that of trust-fulfilling behaviour. However, non-parametric techniques were used to test the significance of this difference and it was found that there was no significant change in the beliefs of subjects between the baseline and the plausible deniability treatment (Mann-Whitney, p=0.607).

**Regression Results for Trust Fulfilling Behaviour**

In addition to information as to the choices of subjects in Task 1 and Task 2, data was collected on each subject’s gender, level of study, school of study and previous experience of participation in economics experiments at UEA. All of these categories were coded as dummy variables for the purpose of regression analysis. Gender took a value of 1 for males and 0 for females, level of study a value of 1 for postgraduate students and 0 for undergraduate students, school of study took a value of 1 for Economics and 0 otherwise and finally, previous experience took a value of 1 if the subject had past experience of participation in an Economics experiment and 0 otherwise.

As an initial precaution, a logit regression was run using the inclusion (or not) of the belief task as dummy variable (1=included, 0 otherwise), to confirm that the mere inclusion of the task in later sessions had no significant effect on subjects’ behaviour. This regression found that the belief task itself had no significant effect on the level of trust-fulfilling (p=0.137).
To empirically test the effects of introducing plausible deniability into the basic trust game, a probit regression was run in STATA of the decision to fulfil or violate trust on the following dummy variables: treatment (1=Plausible Deniability, 0=Baseline), gender, level of study, economics or non-economics, previous experience and an interaction term between economics and previous experience.

| Variable   | Expected Sign | Coeff. | Std. Err. | Z    | P>|z| | 95% Conf. Int. |
|------------|---------------|--------|-----------|------|------|----------------|
| Treatment**| -             | -1.1416| 0.5836    | -1.96| 0.050| -2.2855 - 0.0023 |
| Gender***  | -             | -1.6369| 0.5985    | -2.74| 0.006| -2.8098 - 0.4639 |
| UgpG       | ?             | 0.8192 | 0.6680    | 1.23 | 0.220| -0.4901 - 2.1285 |
| Economics  | -             | -1.8551| 1.1418    | -1.62| 0.104| -4.0930 - 0.3828 |
| Experience**| -            | -2.7843| 1.2868    | -2.16| 0.030| -5.3064 - 0.2622 |
| EconExp**  | -             | -2.8821| 1.4684    | -1.96| 0.050| 0.0041 - 5.7601  |
| Constant***|               | 2.7203 | 1.0161    | 2.68 | 0.007| 0.7286 - 4.7119  |

As can be seen from Table 1, when plausible deniability is added to the basic trust game, subjects are less likely to fulfil trust than those subjects in the baseline treatment, all other things being equal (p=0.050). The effect of gender on the decision of whether or not to fulfil trust is highly significant (p=0.006). Males are less likely to fulfil trust than females, ceteris paribus. The effect of degree level was found to be insignificant on the decision of whether or not to fulfil trust (p=0.220).

There is a significant joint effect of economics and experience (given by the interaction term EconExp) on the decision of whether or not to fulfil trust (p=0.050). This suggests that Economics students with previous experience of Economics experiments are less likely to fulfil trust, holding all other factors constant.

The non-parametric counterparts to the above probit regression were also carried out, but no significant difference was found between the choices of subjects in the baseline treatment and those in the plausible deniability treatment ($\chi^2=1.586$, p=0.208). The only significant effect was gender ($\chi^2=4.716$, p=0.030). Whilst degree level was insignificant as in the regression above ($\chi^2=0.035$, p=0.851) the chi-square test also suggested that there was no significant difference in the choices of Economics students with previous experience of...
Economics experiments (represented by the interaction term in the regression) compared to all other subjects ($\chi^2=0.741, p=0.389$).

**Regression Results for Trusting Behaviour**

The test the effects of introducing plausible deniability in the basic trust game on the level of trusting, a probit regression was run in STATA of the decision to trust or withhold trust on the following dummy variables: treatment (1=Plausible Deniability, 0=Baseline), gender, level of study, economics or non-economics, previous experience and an interaction term between gender and economics. Once again, an initial regression was run to confirm that the belief task itself had no significant effect on the levels of trusting ($p=0.897$).

As can be seen from Table 2, when plausible deniability is added to the basic trust game, subjects are less likely to trust others than subjects in the baseline treatment, all other things being equal ($p=0.042$). The effect of degree level was found to be insignificant on the decision of whether or not to trust or withhold trust ($p=0.117$). Previous experience of Economics experiments appears to have a significant and positive effect on trust ($p=0.050$); if a subject has previously participated in Economics experiments, they are more likely to trust than if they have no prior experience, ceteris paribus.

| Variable      | Expected Sign | Coeff. | Std. Err. | z     | P>|z| | 95% Conf. Int. |
|---------------|---------------|--------|-----------|-------|-----|----------------|
| Treatment**   | -             | -1.2554 | 0.6187    | -2.03 | 0.042 | -2.4680 to -0.0428 |
| Gender**      | -             | 2.4884  | 1.2360    | 2.01  | 0.044 | 0.0658 to 4.9109  |
| Uppg          | ?             | 1.2501  | 0.7977    | 1.57  | 0.117 | -0.3134 to 2.8135 |
| Economics     | -             | 0.8932  | 0.7544    | 1.18  | 0.236 | -0.5854 to 2.3718 |
| Experience**  | -             | 1.2069  | 0.6145    | 1.96  | 0.050 | 0.0025 to 2.4114  |
| GenEcon**     | -             | -4.1108 | 1.6732    | -2.46 | 0.014 | -7.3902 to -0.8314 |
| Constant*     | -             | -1.6076 | 0.9648    | -1.67 | 0.096 | -3.4985 to 0.2833 |

There is a significant joint effect of economics and gender (given by the interaction term GenEcon) on the decision of whether or not to fulfil trust ($p=0.014$). This suggests that male Economics students are more likely to withhold trust than other students, holding all other factors constant.
The non-parametric counterparts to the above probit regression were also carried out. A significant difference was found between the choices of subjects in the baseline treatment and those in the plausible deniability treatment ($\chi^2=3.979$, $p=0.046$). The only other significant difference was found with the choices of male Economics students (represented by the interaction term in the regression) compared to all other subjects ($\chi^2=2.763$, $p=0.096$). Degree level was insignificant as in the regression above ($\chi^2=1.304$, $p=0.254$) but the chi-square test also suggested that there was no significant difference in the choices of students with previous experience of Economics experiments and those with no prior experience ($\chi^2=2.343$, $p=0.126$).

VI. Discussion

It appears from the above regressions that there does seem to be an effect on both the levels of trust-fulfilling and trusting of incorporating plausible deniability into the basic trust game. It’s difficult to say whether or not these results would hold in a study conducted under different conditions, such as a larger sample size, and there is every possibility that the difference between the two treatments could become either more or less significant in future experiments, but so far the results look promising.

The differences in the level of trust-fulfilling could be explained by the moral “wiggle room” motive suggested by DWK. Subjects may consider the act of chance to be providing sufficient moral “wiggle room” within which to act in a more selfish manner. The fact that there is uncertainty as to what causes a violation of trust in the plausible deniability treatment, could be providing the perfect excuse for those subjects who would prefer to violate trust but would also like to maintain an appearance of fairness towards others.

It’s worth noting some of the limitations of this experiment, the first of which is that the belief task was only administered to a small portion of the sample size. This may be why the difference in beliefs between the two treatments was found to be insignificant. With a larger sample size, we could reasonably expect that a change in trusting and trust-fulfilling behaviour would be mirrored by a change in the beliefs of subjects; either subjects would update their beliefs based on the actions which they themselves took in the task, or the introduction of the act of chance itself would alter the beliefs of subjects which, in itself, could lead to part of the observed changes in the level of trusting and trust-fulfilling.
Secondly, the average payments for this experiment were quite low by normal standards and may have lead to unusual or uncharacteristic behaviour. There is also a chance that the dual-role approach to subject decisions may have left some subjects confused as to their interactions with other players in the room. Whilst no subjects expressed any confusion or lack of understanding during the instructions, questionnaires or demographic questionnaire after the experiment, some subjects’ stated methods of choosing between the two options in Task 1 seem to convey a belief that the decision they make in the first task will affect the earnings that they will receive in the second task, despite that fact that it is only their partner’s decision which matters. With a larger budget, subjects would only need to take on one role to reduce possible confusion.

VII. Further Research

The results from this experiment are promising and suggest that further research should be made into the effects of moral “wiggle room” in domains outside of the artificial setting of the dictator game. Whilst further research may prove that this effect is largely diminished or completely wiped out with a larger sample size, this pilot study would suggest that moral “wiggle room” has the potential to be robust to other motives which are traditionally at work in the trust game setting, such as reciprocity. This would in itself present a rather important finding: even in situations where making a decision with money which has been provided by another trusting individual, some people could still prefer to violate the trust placed upon them, but choose to fulfil trust regardless, out of a preference to maintain an illusion of fairness towards others. If given the plausible deniability with which to act in selfish manner, some individuals may choose to violate trust which is placed upon them.

VIII. Conclusion

This experiment investigated the effects on trust-fulfilling, of introducing “plausible deniability” into the basic trust game via an act of chance which violates trust on a subject’s behalf with some given probability. The initial results from the probit regression which was run suggest that there is a significant decrease in the level of both trusting and trust-fulfilling, when plausible deniability is introduced into the trust game. This would suggest that some individuals may actually prefer to violate trust, but are choosing to fulfil trust out of a desire
to maintain an appearance of fairness to others. When given the plausible deniability within which to act in a self-interested manner, some individuals choose to violate trust and exploit the uncertainty as to what exactly causes a violation of trust. Whilst these initial results are promising, further study using a larger sample size, a single-role for participants and larger monetary incentives would need to be conducted to account for the limitations of the current experiment and to test the robustness of the results which have been presented.
References


Why did you choose UEA to study Economics?

For all of us, one positive reason is that it is a somewhat less stressful environment for studying, since studying in Hong Kong can be especially stressful. The grading system in Hong Kong universities is called GPA (grade point average), and it is a system that takes students’ results as a normal distribution. In other words, you need to perform better than your course mates around you, whereas marking at UEA is not done in such a competitive style.

So far, what are the differences of studying in UEA and the universities in your home country?

The atmosphere at UEA is quite different from the universities in Hong Kong. Life at UEA is less intense (though it is indeed demanding) than studying in Hong Kong.

Most of us at UEA are required to study 6 modules, so, Economics students usually have around 8-10 hours lectures and seminars per week in both autumn and spring semesters. In contrast, Hong Kong Economics students usually have 15-20 hours lectures and seminars per week including compulsory modules which are not related to economics. It is incredibly tiring attending lectures and seminars by the end of semesters.

Also, Hong Kong students need to face a mid-term exam during week 6-7 for most modules; much more like a mock-final exam! To compare, studying in UEA may just have 2-3 mid-term tests. In terms of exam pressure, it is relatively lower than for Hong Kong students. Indeed students often face many more pieces of coursework during each semester.
What abilities have you acquired from UEA Economics modules that you believe you cannot gain in your home country?

As international students, the most obvious improvement should be both written and verbal communication ability in English. Besides improvements in English, another precious ability that we believe we have acquired and cannot get in Hong Kong is encouraged co-operation with other course mates instead of competing with each other.

For example, in group projects, tasks were allocated according to individual’s abilities in the group and projects were completed by utilizing individual ability as a team.

How are the future career prospect / opportunities for Economics students in your home country? Is it better than the UK?

Most people’s perceptions of Economics students are that our likely career path is to work in banks and financial institutions.

Indeed, Economics students in Hong Kong are likely to start their career in the financial sector or finance-related authorities. However, relatively, opportunities in Hong Kong are fewer, since there are few medium size firms and competition for a job is strong. As a result, some of the graduates in Hong Kong will choose to have further study abroad, so to enhance their competitiveness.

However, it is not a must for us to start careers strictly in the financial sector. Most companies do need economics students to conduct analysis on their business prospects, pricing strategies and risk management meaning there are a wide range of jobs for us to use our knowledge, so it is important for us to find a career we are interested in.

Special thanks to Ivan Leung for conducting the interviews.
The Life of a Masters Student

by Cameron Belton

From the outside, post-graduate life seems a funny one. Seemingly filling the void between undergraduates and academics, there is an element of uncertainty as to what life is like when aspiring towards an MA or MSc. Certainly, before I seriously began looking into the prospect of applying for a Master’s programme, I had no real clue as to what I would be doing, and even after all my research and open days I still returned to UEA to enrol on the MSc Experimental Economics programme with a sense of trepidation. What I quickly learned, however, was that the coming year would be the most rewarding, interesting and (yes, at times) stressful that I have ever been through in academia. For those of you who have begun to look and apply, or those who haven’t even given it a thought, I hope the following information will give you valuable insight into what life is like as a Master’s student at UEA.

The Courses

Some of the courses UEA offers for the following academic year are as follows:

- MSc Economics
- MSc Experimental Economics
- MSc Finance and Economics
- MSc Industrial Economics
- Graduate Diploma Economics

(The UEA Economics website offers a full list of programmes)

The most noticeable difference between the two types of programmes offered (MSc and Graduate Diploma) is that the MSc (or Masters of Science) is titled an ‘Academic and Professional’ programme, providing intensive research-led study. There is typically a stronger emphasis on mathematics and econometrics (statistics for economics), and the university website suggests this type of programme is more suited to those who wish to gain employment in a professional economist setting (such as in government or financial industry) or as a progression to PhD study. The standard entry requirement for these types of programmes are a 2:1 or above in Economics or a related subject. The Graduate Diploma programme, on the other hand, is better suited to those without an extensive economic background and can act as a platform to further postgraduate study.
The day-to-day running of the course itself is remarkably similar to that of an undergraduate degree. So much so, in fact, that my go-to description to friends who ask what the course is like is that it is “a normal undergraduate year with a dissertation over the summer”. I have studied six 20 credit modules split between the autumn and spring semesters, and my contact time is essentially the same. An average week involves 10-12 hours of lectures, seminars and tutorials in group sizes ranging from 5-50. The modules (worth 120 credits in total) have been a mix of coursework and exams (sat in the regular exam period in the summer semester) and I am currently completing my dissertation, worth 60 credits, taking the total Masters programme to 180 credits, completed from September to September. A Pass in a Masters is 50%, and a 70% will earn you a Distinction (some universities also award a Merit to those with 60%) and passing the dissertation, as well as all modules is a requirement for obtaining the qualification. Because the dissertation isn’t completed until later August, graduation always takes place the following academic year (so despite finishing in a month or two my graduation will not be until July 2015).

What is the Work Load Like?

One common response I get from people when I tell them I’m studying for a Masters “there’s no way I could do one!” I think there is probably a fear of the unknown, and the grandeur of a title of “postgrad” evokes ideas of being a library hermit, emerging bi-monthly only to sup real ale in the Grad bar before returning to try and uncover the mysteries of the universe.

However, the entry requirements exist for a reason. If you are capable of achieving a decent 2:1 or First at undergraduate level you will have the foundational knowledge to be successful at a Masters level. I personally felt the step up was not too dissimilar from second to third year. What often separates success from failure, however, is effort level, and there is little room to just coast by doing the bare minimum. There is a greater expectation on reading around the subject and often seminars will focus specifically around the additional reading. With just a handful of people in most seminars, free-riding off others is not possible it is painfully apparent if someone has not prepared for that week. Coursework is typically similar to undergraduate modules; this year I have given presentations, handed in essays, taken mid-semester course tests and sat computer tests. Whilst the content is naturally more complex, you find yourself working harder and you have years of academic experience of how best to tackle these types of assessments.

On top of these, more standard, assessments, the Masters programmes offer the opportunity to tackle different types of assignments. This year we have undertaken a team project taking enormous datasets from global organisations and created statistical models
with them. It was gruelling but it was also fascinating, and a real insight into the roles of statisticians in both the professional and academic world. As part of my Experimental Economics modules I was able to design and run my own economics experiment, creating an experimental design, finding subjects and analysing the results, and it remains my proudest academic achievement to date. Most courses at UEA require a pre-sessional maths and statistics course before the Masters begins in September, but this allows you to be re-introduced to the academic environment as well as meeting your new course-mates over the course of a fortnight.

Is It All Work and No Play?

Not necessarily. Whilst the course encourages you to work hard, of course there are opportunities to indulge in extra-curricular activities. The GSA (Graduate’s Student Association) at UEA is free to all postgraduate students enrolled and offers a host of events such as weekly sports sessions (covering everything from running to volleyball) as well as social events such as quizzes, jazz nights or pub crawls. This year, though no formal society exists, the Economics postgraduate community has boomed and we are a close-knit group of friends. There are plenty of opportunities of socialising and I have made a number of great friends this year, from all over the world. Aside from studying I have worked part time and played for a university football team, so whilst you have to manage your time well, there is much more to the life of a postgraduate than sitting in the library.

How To Apply?

The application process is obviously a very important part of not only getting on any course, but getting on the right course. It is vital to think about what you want to get out of a programme, and where you want it to take you. For me, I graduated from UEA with a BSc and had an overwhelming feeling of wanting more. I had been fascinated by my introductions into behavioural and experimental economics and from there UEA was an obvious choice. The Centre for Behavioural and Experimental Social Sciences (CBESS) promised the opportunity to run my own experiments and the prestige of the academics spoke for itself (this too is the case for the Centre for Competition Policy and MSc Industrial Economics). A previous volume in this series (Volume 7- Beyond the BSc) provides a detailed insight into the application process for a Masters and I would implore anyone interested to read that useful article. There are scholarships and funding available but naturally these are competitive, so it is important to do your research and give the best account of yourself in the application process.
What Does It Teach You?

As well as the obvious learning of economics in greater depth and the problem solving skills I have developed, studying for a Masters has taught me many valuable things. For one, the style of learning is much more independent (though you develop closer relationships with your lecturers), and this style of independent research teaches you great analytical skills, deciding yourself what is and what isn’t relevant or useful. The dissertation offers you the opportunity to contribute an original and significant piece of work to the academic literature, and that is a fantastic opportunity to showcase a piece of work that requires dedication and graft. When I think about typical competency based interview questions I’ve been asked in the past, there isn’t any that I would not be able to offer an example based on what I’ve learnt as a Masters student. As a collective group of Economics postgraduates we have many going off into high-level graduate jobs, as well as others, like myself, progressing into PhD research. A Masters not only opens new doors but pushes you further along in a very competitive job market.

In between graduating with my BSc and starting towards my MSc I worked for a year, to decide if further study was really what I wanted to do. I decided it was and so I came back, passionate but a little bit daunted. Having help run a delicatessen for a year I knew the tasting notes of a good Chilean red wine, but I hadn’t thought about IS-LM curves for a year, and I was unsure how I would cope with the return to education. However, I needn’t have worried as I very quickly found myself back in a student mind-set. In our induction lecture, one lecturer told us “Masters students don’t have fun, or sleep. They work.” In many ways they are right. You absolutely immerse yourself in your study; you wake yourself up at night thinking about a solution to a problem or think about a new idea to a topic you’re researching when out having a drink with your friends. And yet, if you’re anything like me, you’ll absolutely love this. This previous year has been the most enjoyable of my academic life and I urge everyone who has an interest in furthering their study to take a look at your options and see if they can find something right for you.

I wish you all the best of luck in whatever path you choose.

Cameron Belton
Book Review: Predictably Irrational
By Mengjie Wang

Standard economics describes us a wonderful world to live; people are making rational decisions all the time, not letting their emotion cloud their judgment, and always thinking about the future. What super-men of the mind we are. However, do things in our lives always seem like these?

Clearly, the answer is not! By conducting a series of illuminating and surprising experiments, MIT behavioural economist Dan Ariely shows that we are good at what we are, irrational! In those experiments, we see people procrastinating, not taking care of their health, not saving, cheating, and getting their emotional best out of them. These are all kinds of mistakes that we make all the time. People make mistake, get confused, and can't think about the future. Real life shows us the cruel reality – we are all biased, and we can’t help it!

We do accept that standard economics has a beautiful singular theory. It provides us with clean models, with formulas, algorithms, and so on. But isn’t the goal related to reflecting the world as accurately as possible? Only by recognizing that we make cognitive mistakes for sure can we potentially counter against it. Only by recognizing this inherent bias, we can actually think about how to improve the world.

Luckily for us, Ariely not only uses his light and breezy style to describe studies demonstrating the situations in which we display irrational economic behaviour, but also, he explains how to break through these systematic patterns of thought to make better decisions.

So if you haven’t read Predictably Irrational, don’t miss out this great chance to understand your behaviour and make your life better. Hurry up! The clock is ticking, and you are going to make mistakes!
Book Review: China’s Silent Army
by Imogen Turner

Did you know The Chinese have a monopoly over Peruvian iron mines? No, I didn’t either. This is an example of China’s sphere of influence spreading and becoming stronger.

The book China’s Silent Army is a piece of investigative journalism; it explores how China is able to conquer seemingly impossible markets. Major reasons include strong cultural ties and high labour mobility as private companies often import workers from China.

The authors travel the globe from Central Asia to Africa, Burma and South America where they report their experiences first hand. As the book continues, it is easy and interesting to compare and contrast the differences between China’s influences across these areas. A common theme becomes apparent where China agrees to invest in infrastructure, education, develop transport systems and help countries develop in exchange for natural resources. However, this is not a fair deal, local labour is often exploited and the environment is damaged. Such is the case in Peru. China’s state owned company- Shougang Hierro Peru is the only active iron mine in Peru. Workers are exploited as the pay is half that of the average Peruvian salary, working conditions are poor and there are frequent accidents as old machinery often breaks. Many of the workers suffer from lung diseases from mineral dust and the local fish stock have been poisoned by toxins in the water. The extractive nature of China’s foreign activity is currently unchallenged, even though the case of Shougang Hierro Peru has featured in The New York Times.

The book summarises China’s bad behaviour and examines the major negative externalities of China’s pursuit of growth. On the other hand, the Chinese have created jobs and have helped countries develop. Perhaps as infrastructure and institutions develop, these foreign countries will become better equipped to stand up to the Chinese? Nevertheless, China’s abuse of human rights, disregard for the environment and exploitation needs to be addressed.

China's Silent Army is an easy read and is relevant to development and macroeconomics especially. Although one sided, it does provide a useful recent history of China’s economic situation and is a worthwhile read.

If interested, the book China Goes Global by David Shambaugh is an extension on China’s expansion.
“Bitcoin: Currency or Commodity? Is there a future for virtual currencies?”
By Jack Whybrow

What’s all this hype about the Bitcoin I have been hearing?

Bitcoins have been around since 2009 but unlike the pound sterling do not rely on a central authority for either creation or management. It relies instead on cryptography. Bitcoins can be mined by employing computing power to solve complex algorithms. Users then store these in a bitcoin wallet. These can then be transferred from users to user to purchase some types of goods and services or exchanged for traditional money. The exchange rate for a bitcoin has been a rocky one starting in 2009 where one bitcoin was essentially worth nothing to a peak of $1,250 (£750) in November 2013.

Okay, but what determines how much a bitcoin is worth?

This depends upon supply and demand. Supply with respect to how many bitcoins are being traded at any particular time and the total number in existence. Demand by how much people are prepared to pay. The latter depends on a number of features such as how many sellers accept bitcoins. Clearly though one of the main advantages of using bitcoins over traditional money is that transactions are harder to trace and have been associated with illicit sites such as ‘Silk Road’.

Fair enough, so which is it, a currency or commodity?

Currently, I would say it is more of a commodity that can be bought and sold rather than a generally accepted form of payment. One of the main stumbling blocks bitcoins and other virtual currencies face is their volatility. After all economic theory tells us these have to be a good store of value. If this can be overcome a future currency may be on the cards for the humble bitcoin.