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ECONOMIC GROWTH IN THE POTTERIAN ECONOMY

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Economic Growth in the Potterian Economy

Abstract

We study the economic structure of the life of Harry Potter and his co-actors as an economic model that governs the social organization of their economic activities. Our goal is to study and understand the internal consistency of the Potterian economic model and explore the relationships between its assumptions and the situation in the real world, as reflected in the Potterian model. To accomplish this, we focus on a textbook version of Solow's economic growth model. The analysis of the Potterian economy reveals that the Potterian model fits quite well the predictions of the economic growth model. We discuss potential implications of this finding, and explore the link between Potterian economic structure and performance in a broader context by discussing the link between economic institutions and economic outcomes.

Introduction

For a literary work to succeed, it needs to conform to the expectations and beliefs of its readers. In particular, the text must succeed in convincing the readers that its plot is logical and internally consistent. Otherwise, readers, who judge plots against their own experience, would probably find it difficult to identify with the actions of the heroes and the development of the plot.

Internal logic and consistency are also necessary ingredients of any scientific model. The main differences between scientific models and literary works lie in their goals and in the way their success is judged. A scientific model is judged according to its ability to yield results and generate predictions that are in line with real world data and observations, while a literary text is judged according to its ability to appeal to readers.

For readers to follow and relate to the plot, they must identify with the rules that guide the actions of the book's heroes and the environment in which the heroes live and operate. Thus, for a book to be a best-seller, a large number of people must identify with the norms and the rules that drive the plot. A fictional world that is governed by rules that are not consistent with readers' beliefs and logic is not likely to be popular. And since readers' understandings of the world are based on their own real-life experiences, it seems plausible that models that guide the fictional worlds of best-sellers likely reflect the readers' attitudes and perceptions of their own real-world environment and society. Therefore, understanding the set of rules that drives the plot in a best seller may also assist in studying the readers' beliefs on how the real world functions.

The Harry Potter books enjoy a universal success and they are probably the biggest best-sellers of their time. This popularity suggests that the Harry Potter books

offer readers around the world an internally consistent model that appeals to their intuition and expectations, and is in line with the way they view and perceive the world. For example, psychologists and economists such as the Noble Prize winner Daniel Kahneman, often find that people like to think about the world as a place that is governed by regularities, and as a consequence they tend to underestimate the probability of unlikely events.[1] The Harry Potter books, though fantasies, obey this psychological need and follow strict laws of logic as demonstrated in *The Goblet of Fire*, where almost nothing occurs as a result of pure luck or coincidence. In that book, even things that look like pure coincidences, like an elf that is found in an unusual situation, have a sinister and logical significance.

Many readers may not notice that Harry Potter and his friends operate not only in a social world, but in an economic one. They buy, sell, trade, and engage in banking. We are interested in the economic world of Harry Potter because as economists, we build models and use them to obtain insights and predict events in the real world. When we build these models we make assumptions about the way people perceive and act in their economic environments. We are therefore interested in finding out whether our assumptions, and the insights and predictions that our models offer, appeal to laymen as well as to professionals. Otherwise, since the real economy consists of many individual decision-makers who act according to their understandings of the world, we may find that many economic models fail in some of their predictions.

If, as we assume, best sellers are books that reflect the readers' model and perception of reality, then the popularity of the Harry Potter books suggests that the

[1] See Tversky and Kahneman (1974).

attitudes, the norms and the perspectives the books offer on economic organization of life must appeal to an almost universal audience. By looking at the economic organization of the world described in these books, we may learn something about the attitudes and understandings of their readers.

In this essay, therefore, we take a look at the economic aspects of the life of Harry Potter and his co-actors. Our goal is to study the economy in the Harry Potter books as a model of a real world economy. We use the term "Potterian economy" to refer to this economic model. We compare the Potterian economy with the Solow growth model, which is one of the most important economic models for studying income determination and economic growth. We search the books for what Frank Knight called "social organization of economic activities," and we study the similarities and differences between the Potterian economy and the real world economies.[2]

In many cases, we find that the real and the imaginary worlds are quite similar, which underscores the reality's prominence in the readers' eyes. But there are differences. We take the differences between the real and imaginary worlds to reflect what readers would have *liked* to see. By focusing on the differences while controlling for the similarities, we can make some inferences about the way readers might perceive the economic institutions of the real world.[3]

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[2] See Knight (1965).

[3] Some might say we are reading too much into the books. After all, the lack of economic growth in the Potterian economy (as we document in this study) might merely serve the author as a simplifying assumption adopted for plot purposes rather than a description of some "ideal" world or the exposition of a particular point of view. But simplifying assumptions only work when they do not stray too far from reality, or else readers are not likely to accept them. That readers accept a fictional economy with these characteristics suggests that they might not be too far from the readers' perceptions and beliefs, regardless of the reason why the author settled on them.

The Solow Growth Model

Ever since Adam Smith published his book *The Wealth of Nations* in 1776, one of the most important goals of economic science has been to discern and identify the factors that affect the economic growth of countries and the welfare of their citizens. The topic of economic fluctuations and their effects on employment, growth, consumption and income became even more important after the Great Depression in the 1930s, a period during which the average U.S. unemployment rate peaked at twenty-five percent.

In this essay, we rely on the model of growth and development formulated by the Nobel Prize-winning economist Robert Solow as a framework for studying the factors that affect the growth of the Potterian economy.[4] The Solow growth model is a standard textbook workhorse framework for studying economic growth and its determinants. When economists talk about "economic growth," they mean growth in per capita output (or income) and consumption. The Solow growth model focuses on three main ingredients: two factors of production and technological progress. The two factors of production are (i) labor (or population) growth and (ii) investments in physical capital. Technological progress can take one of the two forms. First, technological progress can occur through technological innovations such as improvements in machinery and equipment. Second, technological progress can occur through improvements in the skills and the productive abilities of the work force. The stock of per capita education, training

[4] See Solow (1956, 1957).

and experience that affect the skills and productiveness of the workers is usually termed "human capital."

Like all models, the Solow model ignores some important aspects of reality that affect welfare and growth, such as inequality in income distribution, productivity differences between workers, and social and political institutions and environments. But its simplicity and elegance make it extremely useful as a benchmark model for analyzing and predicting the long term growth and the performance of economies.

The model assumes that an economy's total output increases when the economy has more workers, more physical and human capital, and better technology. The model also assumes that the returns on investments in physical capital decline as the stock of physical capital per worker increases. This is what economists often call "decreasing marginal product." If, for example, you provide one tractor to a farm where all the workers are using shovels and sickles, production will increase dramatically. Providing a second tractor will also increase production, but not as much as the first one did. Each tractor you add increases the productivity, but the productivity gain of each additional tractor is smaller than the one before.

Similarly, economists also assume that the returns on investments in human capital decline when the stock of human capital per worker increases. As an outcome of these assumptions, the model predicts that an economy's total output increases when the economy has more workers, more physical capital per worker, and more human capital per worker.

It follows that economies with higher birth rates will enjoy greater growth in total output than economies with lower birth rates. However, growth in output does not

guarantee economic growth, because economic growth is achieved only when there is growth in the *per capita* output and consumption. Thus, when the population grows, the total output has to grow faster than the population in order for the output per capita to increase. Similarly, when population grows, the stock of physical capital has to grow at least as fast in order to sustain economic growth.

However, when an economy increases its stock of physical capital, it has to spend a larger share of its output on maintaining and operating the larger stock of physical capital. As a consequence, increasing the stock of physical capital is a necessary but not sufficient condition for economic growth. In the Solow model, only constant investments in technology and in human capital lead to long-term economic growth, because investments in technology and human capital make workers more productive, and more productive workers earn higher incomes which enable them to increase their consumption and welfare.

Thus, the Solow model predicts that differences in human capital are a major source of differences between economic outcomes across countries. For example, according to the Solow model, a large proportion of the difference between developed and developing economies is an outcome of the differences in the stock of human capital (education, training, and experience), rather than the differences in physical capital.

Another prediction of the Solow model is that investments should flow from rich to poor countries because decreasing marginal product of capital (the tractor example) implies that the return on investments in physical and human capital is greater in countries with lower stock of capital. The same amount of money invested in physical and human capital in a *developing* country should, in theory, give a much bigger return

than the same amount invested in a *developed* country where capital stocks are already high.

In the following sections, we study whether these predictions of the Solow model apply to the Potterian economy. To accomplish this, we examine the effects of education, population trends, and capital accumulation on the Potterian economy. In doing so, we also discuss some implications of the findings for real world economies.

Education and Investment in Human Capital

In the Solow model, education improves human capital, improved human capital increases worker productivity, and increased worker productivity contributes to economic growth. Moreover, workers with better education are more likely to invent new technologies or improve existing ones. Thus, economies with a large stock of human capital per capita are also more likely to have a high rate of technological innovations and progress.

Thus, it is not surprising that governments as well as individuals around the world spend a large proportion of their income on education.[5]5 There is much disagreement, however, on the efficiency with which these investments are made.

Because the Potterian education system receives a special emphasis in the books, we are able to analyze it in detail and assess its likely implications for the Potterian economy. Many of the shortcomings of the modern education system, we note, also exist in the Potterian world. Following our assumption that the Harry Potter books appeal to

[5] See Young, Levy, and Higgins (2004).

readers because they reflect an environment with which they can identify, we argue that an economic analysis of the Potterian world might offer some insights on readers' beliefs about the current and future state of education.

Harry Potter is a student at Hogwarts School of Witchcraft and Wizardry, a boarding school for underage wizards, and most of the events described in the books take place there. From the first day Harry Potter arrives at the school, and throughout the books, it is clear that at Hogwarts, the curriculum focuses on practical rather than theoretical subjects. Few of the subjects studied are aimed at improving the students' general or theoretical knowledge. Instead, almost all the subjects have practical orientation. The courses in Potions, Herbology, Charms, Care of Magical Creatures, Astrology, Defense Against the Dark Arts, Occlumency, Flying, Apparition, Transfiguration, Enchantments, and Divination all are practically, not theoretically, oriented.

The classes themselves seem to be almost entirely dedicated to practice. At Harry's favorite, Defense against the Dark Arts classes, for example, students are taught to perform various spells and counter jinxes. The class tests consist of putting these skills into action. Similarly, during Charms classes, the students practice casting various useful spells, while at the Transfiguration classes the students study how to change the shapes of various objects and animals. But in none of these classes are the students required to study *why* magic works. Little or no time is devoted to the study of the "Theory of Magic." The wizards adopt a black box approach towards magic. It seems that wizards find it important to know how to *use* magic, but unnecessary to study *how* or *why* the magic works.

It is not surprising, therefore, that Hogwarts' students are good in replicating others' work, in finding facts, and in following instructions precisely. But when it comes to inventing, innovating, or open-mind thinking, Hogwarts' students are less successful. The paragon of Hogwarts students, Hermione Granger, is an example. Hermione does extremely well at the school because she has a remarkable ability to learn facts and use her knowledge at the right moment. When it comes to originality and innovation, however, she does very poorly. For instance, in *The Order of the Phoenix* she tries to establish a secret and secure communication channel between her friends. Despite her contempt for the evil Voldemort and his supporters, the only solution she can come up with is to mimic their communication protocol, even though it has some obvious weaknesses. Her friends, instead of trying to improve her solution, simply accept her authority and praise her for her inventiveness and skill, although she is honest enough to identify the source that inspired her. Another example is given in *The Deathly Hallows* when the Order of the Phoenix continues to use the same protective procedures that failed it in the past because none of its members is able to suggest any alternative procedure, despite the fact that some of its members are among the most able wizards in the world.

While the books focus mostly on Hogwarts, these same shortcomings also seem to apply to other schools in the Potterian world. When students from the three best wizard schools in the world meet for a competition in *The Goblet of Fire*, the reader learns that none of the school champions could have completed their tasks without outside assistance, because they all lack the ability to think originally. Barty Crouch emphasizes this point when he boasts that the schools' champions are fools who cannot work out clues on their own.

The lack of emphasis on a general knowledge in the Potterian education system continues when students graduate from Hogwarts. Nowhere in the books is there any mention of a higher-education system. Wizards do not go to colleges or universities after graduating. Instead, they choose a profession and dedicate their careers to it. Indeed, there is even a fairly sophisticated system of job-matching where students are encouraged to take classes that will be particularly useful for their future careers. None of the students, however, not even Hermione, is advised to study further. This underscores the heavy emphasis that the Potterian education system puts on the narrow goal of obtaining practical knowledge that helps the graduates in finding jobs, but not in advancing further the knowledge of magic.

In the real world, universities, colleges and other research institutes have advantages over other types of learning institutions in that they provide a broader spectrum of knowledge and create what economists sometimes refer to as "non-rivaled" knowledge.[6] Such knowledge, which can be widely shared, serves the entire society in innovation and advancement. When society gives no weight to this type of knowledge and prefers instead that people specialize in one field and dedicate all their energy to serving their workplace—effectively keeping their knowledge as private property—then universities and colleges have no competitive advantage over on-the-job training programs, and there is no reason, therefore, for people or governments to finance a

[6] In economics, a good is "rivaled" if its possession by one party effectively excludes another from it. Only one person can wear a hat at a time; no one else can wear it so long as the original wearer enjoys it. Goods are "non-rivaled" if a person's enjoyment of them doesn't keep anyone else from enjoying them. For example, a television broadcast or a beautiful day is a non-rivaled good because enjoyment by one person does not exclude anyone else. General knowledge is a "non-rivaled" good because one person's possession of the knowledge does not exclude anyone else from acquiring it.

university education. Indeed, the government's attitude to formal education is revealed when the ministry of magic first appoints Dolores Umbridge as a schoolmaster and then as a judge, although she has no formal training in either education or law.

The lack of research universities and of professionals who are trained to think and inquire has other implications as well. For example, when in *The Deathly Hallows*, Harry Potter and his friends need help in understanding the relationship between a legend and their current situation, they cannot turn to a scholar who specializes in ancient myth. Instead, they have to find Xenophilius Lovegood, a wizard who is considered a lunatic by his community because he looks for the grains of truth hidden in myth and legends.

Thus, as the students from Hogwarts mature and leave for the job-market, their inability to create and to innovate goes with them. Even the best of Hogwarts students seem to prefer jobs in the public sector or at established institutions. None of the good students try to open a place of their own or try to sell a new product or service.

The only ones who innovate are those who grow outside the system. Professor Dumbledore, Lord Voldemort, Professor Snape, and the Weasley twins are all wizards who disregard the official schooling curriculum. They are the only ones who try and decipher what lies behind the written orders and instructions in textbooks, and come up with new solutions, such as the *Levicorpus* spell invented by Professor Snape as a schoolboy and discussed in *The Half Blood Prince*.

The lack of originality and creative thinking in the Potterian economy is also the source of the Weasley twins' success as entrepreneurs and shop-owners. They are the only students who ignore schooling and prefer the trial-and error method. But their success only serves to highlight the general state of affairs. We see a public that wants

innovations and is willing to pay for them. Yet before the Weasley twins open their shop, no new business has opened in Diagon Alley since Borgin & Burke's, many years before Harry Potter was born.

Thus, the Hogwarts education system, with its emphasis on practice rather than theory, seems to yield poor results. More importantly, it contradicts the goals of scientific education. The Potterian education system seems to belong to a different era, an era when people tended to rely on authorities rather than to look and search for new knowledge on their own initiative. The advantage of the scientific method over other methods for obtaining knowledge is that it emphasizes the systematic, empirical search for answers over various types of "why" and "how" questions. Economists like Fernand Braudel and Joel Mokyr have argued that it was the change in the way people thought about obtaining knowledge that led to the industrial revolution and to the modern world.[7]

The Potterian educational system thus departs sharply from the objectives of the modern education system. It seems to fail in providing its students with the tools that are necessary for inventing new technologies and innovations. As a consequence, the Potterian economy lacks the ability to come up with the constant stream of innovations and new and fresh ideas that is required for sustaining technological progress.

It is therefore intriguing that readers can relate to the Potterian education system and find it appealing. A possible explanation is the gap between the achievements of modern science and the uses of the machinery invented by this science. For example, most education systems view skill at using computers as compulsory, but they do not require students to study how computers function. The same attitude is often found at the

[7] See Braudel (1979) and Mokyr (1992).

workplace as well, where the emphasis is on workers' ability to use rather than understand the machinery they work with. This leads students with future career opportunities in mind to choose more narrow technological studies at the expense of theoretical subjects. This might be a reflection of the recent trends in the Western market economies toward studying more practical and market-oriented subjects such as engineering, business, medicine, law, and computer science.

Further underscoring the emphasis that Hogwarts gives to practical subject matters is the almost complete absence of classes in humanities and general knowledge from its curriculum. The wizards' teaching material includes only two subjects that seem to be purely theoretical, Arithmancy and History of Magic, and of these two, only History of Magic is obligatory. It appears, therefore, that students in the Potterian world do not study arts, philosophy, or other purely theoretical subjects. The fact that wizards do not learn sciences explains why Arithmancy which is Hogwarts' equivalent of mathematics is redundant for most students; when one does not study sciences, it is unnecessary to study the language of the sciences, mathematics. This magnifies the effect of the narrow teaching curriculum, and may further explain why Hogwarts students lack the ability to think for themselves.

If the Potterian model reflects a situation readers are familiar with, then this suggests that readers of Harry Potter do not view the current schooling system as one that encourages creativity and originality. It suggests that the readers expect that new school graduates would focus on maintaining and per-haps improving existing knowledge and technologies rather than searching for new inventions and innovations. It also suggests that the readers seem to agree with the view that the education system gives greater

emphasis to private job oriented schooling and less emphasis to general education which yields general and unrivaled knowledge.

Another important question that is related to the issue of investments in human capital is the lack of classes in spoken foreign languages. The Solow model predicts that since investment is most profitable in places where the stock of existing capital is small, investors and entrepreneurs would choose to invest more in developing countries. This process should lead, over time, to a more equal distribution of capital and wealth across nations, a phenomenon often termed "income convergence" in the economic literature. The real world data, however, does not support this prediction. The Potterian model may offer some clues for this "home country bias."[8] In the Potterian economy, more so than in our world, wizards should have little concern for distances when they do business. The books give ample examples of the ease of travel and communication in the wizards' society. Wizards can fly from one place to another on personal broomsticks, or they can use the Floo network, Portkeys, or transportation spells to move instantaneously from place to place. This absence of significant transportation cost should facilitate trade between wizards even from the most remote places. Consider for example the price of eggs: if wizards can travel at zero or low cost between any two points, and if the price of eggs is much lower in one place than another, then every wizard would shop at the place with the lower price.

[8] This is the term used by economists to refer to the phenomenon of investors' apparent preference to invest in their home countries rather than investing in other countries even if the latter would yield higher returns on the investment. Possible explanations for the home country bias include lack of information about many aspects of the conditions in foreign countries which include political risks, economic uncertainty, policy uncertainty, exchange rate risks, etc. See Levy (1990, 1995, 2000) and Lewis (1999).

The situation depicted in the books, however, does not indicate such an open market. Potterian wizards interact with foreign wizards only rarely. Harry Potter and his friends do not meet foreign wizards until they go to the Quidditch World Cup Tournament in *The Goblet of Fire*, when they are almost fifteen years old. This initial interaction with foreigners is also marked with a series of misunderstandings. Ludo Bagman, who is in charge of the cooperation with official delegations from abroad, does not feel embarrassed to boast that he cannot communicate with his guests.

In addition to the lack of foreign languages skills, Hogwarts students are also unfamiliar with other nations' cultures and traditions. When foreign students arrive at Hogwarts in *The Goblet of Fire*, a feast is held in their honor. At the feast, French dishes are served, but many Hogwarts students pass on them because they are unfamiliar with the strange flavors, names, and appearances of the food. A similar kind of disrespect and lack of cultural knowledge is displayed by the visiting foreign students. French champion Fleur Delacour is keen to show the superiority of her nation's way of doing things, but her remarks in *The Goblet of Fire* that "we 'ad a different way of doing things. I think eet was better," often irritate her English hosts.

The mistrust between people of different nations is also demonstrated by the fact that one of the first tasks that Percy Weasley receives in the ministry of magic is to set regulations to stop the import of cauldrons because imported cauldrons are of a "low quality."

The same problem of distrust and misunderstandings also exists between wizards and other creatures. For example, when Harry Potter tries to negotiate with a goblin in *The Deathly Hollows*, he finds that the possibility of reaching a satisfactory contract is

made complicated by his inability to understand the goblin's traditions and style of negotiations.

Thus, in the Potterian world, negative sentiments towards foreigners are found both among average people, like the Weasleys, and public officials, like Bagman. In the Potterian world, young people from different countries are unable to communicate with each other, and they only meet sporadically. When they do meet, it is in situations that encourage animosity rather than cooperation, such as the Quidditch World Cup and the Tri-wizard Tournament. The Potterian world shows that a lack of both the will and the ability to communicate with foreigners may be an important barrier to international flow of goods, services, and ideas. This is consistent with recent work by economists that suggests that trade patterns are often determined not only by objective characteristics (such as profits and costs) but also by cultural aspects such as religion, history of conflicts, genetic similarities, and languages.[9] A good example is the trade between Canada and the United States. Despite the fact that people from these two nations have a strong common heritage and speak the same language, they nevertheless trade with each other much less than the standard economic model would predict.[10]

The implication of the Potterian experience is that lowering the costs of transportation and removing trade barriers such as tariffs might not be enough to promote international trade and investments. Insufficiently broad education and stereotypical beliefs may form barriers to international commerce and trade. The Potterian model suggests that international trade will not reach its full potential as long as people do not invest enough in studying foreign languages, culture and institutions.

[9] See Nitsch (2000), and Guiso, Sapienza and Zingales (2004).
[10] See McCallum (1995) and Engel and Rogers (1996).

Population Trends

Since the baby-boom that followed World War II, the population growth rate in most of the developed world has been on the decline. In some developed countries, the natural growth rate, that is, the difference between the number of births and deaths is already negative. There are fewer children and more old people. In 2005, for example, the population growth rate in Italy was only 0.07 percent, despite a positive immigration rate of over 2.2 new immigrants for every 1,000 Italian citizens. This leads to a decrease in the local labor force and to an increase in the demand for foreign labor, in addition to an increase in the demand for health services and retirement expenditures for the aging population. At the same time, other countries have such a high population growth rate that they cannot produce enough to meet the population's needs and wants. As a consequence, people in these countries suffer from starvation and fight wars over natural resources.

In the Solow model, this is mainly explained as a result of changes in the stock of physical capital per worker. Holding everything else constant, when physical capital in an economy grows at the same rate as the population, the per capita stock of physical capital does not change and the economy's total output grows at the same rate as the labor force. When capital accumulates faster than the population growth, the per-capita stock of capital increases and the economy's total output grows at a faster rate than the population. When the population grows faster than physical capital, then the per capita stock of physical capital decreases and per capita output decreases.

Thus, developed economies that have low birth rates and large investments in physical capital, enjoy economic growth. Economies such as those of Sub-Saharan Africa which have high birth rates and low investments in physical capital have a low or even negative economic growth.

In the Potterian economy, population trends are similar to the situation in developed countries during the 1990s, and they do not seem to increase even after the conclusion of the war in *The Deathly Hallows*. Thus, the birth rate in the Potterian economy seems to be extremely low. Recall that for the population to remain steady, every married couple must have at least two children. Wizards do not appear to cross that threshold. Almost none of Harry's friends and classmates have siblings. The main exceptions are the Weasleys and the Patil sisters. However, the six Weasley children are such an uncommon phenomenon that other children sometimes ridicule them, and Padma and Parvati Patil are twins, so they do not break the rule of one pregnancy per woman. Since almost all of the wizard children in the United Kingdom study at Hogwarts, this implies a birth rate of no more than 1–1.5 children per woman, which is as low, or even lower, than countries with a negative natural population growth rate. In Italy, for example, where the birth rate is about 1.2 children per woman, it is only about eighty percent of the death rate, leading to a decline in population. The situation does not seem to be very different in the wizard community where the low birth rate leads to the disappearance of some of the old wizard families, such as the Blacks and the Gaunts.

We previously saw that human capital growth in the Potterian world is low, given its lack of innovation. If population growth is negative, and population declines, then the Solow model predicts that total output should reach a standstill. The wizards, however,

are used to a high quality of life. To maintain the high standard of living, they must retain their workforce to sustain production. This is particularly true in areas where wizards seem to dislike to work such as factories, manual services, and banking. To satisfy their need for workers, wizards rely on two sources. First, they enslave various humanoid creatures and force them to do some of the most unpleasant work. The house-elves that fill the role of house serfs, for example, do all the unpleasant housework for well-off families and institutions. Another example is the goblins. According to Harry's history books, the goblins fought several wars against the wizards but they were defeated and were forced to give up much of their freedom. In return, the wizards allow them to make their living by operating financial institution. It seems that the wizards regard those who handle money as avid and as usurers, so they prefer to leave this job to outsiders.

A second source of workers is immigrants. Those are people with magical skills who are born to parents that are not wizards, and immigrate from their communities to the wizard world. They do so in order to win the advantages of living in the wizards' economy, which is still richer and more advanced than the non-wizards' economy, despite its very slow growth rate. For example, wizards control means of production that allow even the poorest wizards to live in a relative comfort. Even the Weasleys—although poor, live in a large house in the countryside, are connected to a quick transport and communication system (the Floo network), receive the newspaper every day by mail, have the wizard equivalent of television, and possess many other useful utensils, such as knives that chop on their own, and stoves that ignite on command. Most importantly, they always have enough to feed both themselves and any number of guests who pay them a

visit. Thus, given the wizards' high standards of living, it is not surprising that Justin Finch-Fletchley, for example, gave up prestigious Eton in order to study at Hogwarts.

The dependence on immigrant workers, however, raises many difficulties within the wizard community. The old wizard families are enraged that newcomers compete with them in the job market, and they mock the immigrants for their cultural backwardness. There is also strong racial discrimination against the wizards who come from non-wizards' families. For example, the wizards use the term Muggles to refer to people who do not possess magical skills, and they often use the derogatory term "Mud-blood" to refer to wizards who were born in families of Muggles. Many wizards from old families, such as Lucius Malfoy and his colleagues, actively act to limit the number and power of the immigrants. For example, Malfoy does not hide his motives for objecting to Professor Dumbeldore's appointment as the headmaster of Hogwarts. In *The Order of the Phoenix* he declares in a newspaper interview that in his opinion Dumbledore is wrong for not discriminating enough against other races and children from non-wizard families.

It seems that many of the wizards who sympathize with Malfoy want to limit the ability of Mud-bloods to compete with the pure-blood wizards for prestigious jobs and to move up the social ladder. The hatred of the upper tiers of the wizard society towards the newcomers is so great that the "Death Eaters," a well-funded and well-organized group that supports Lord Voldemort and serves as his private army, go to war against the wizard establishment over the issue of limiting the power of Mud-bloods. In the later books this group enjoys so much success that those who oppose it, such as Harry and his friends, consider themselves to be a minority that must hide their activities. This is a testament to the large public support that anti-immigrant feelings and views have in Potterian society.

Indeed when the government sets a task force to send all the Mud-bloods to prison, it seems that its actions win the support of many of the wizards' middle class.

Even before the outbreak of the violence, however, it seems that efforts to prevent immigration have been successful enough to prevent population growth. The number of immigrants seems to be large enough to prevent an actual decline in the size of the workforce, as indicated by the fact that Hogwarts opens every year with about the same number of students. Hogwarts, however, does not grow, and there is no indication that there is a need to increase the number of schools in the wizard community. But the population balance in the wizard community is not stable. The social schism, the prejudice, the restrictions, and finally the civil war that shakes the Potterian world could seriously impair the society's ability to keep its population from decline.

The population trends in the Potterian world are consistent with the Solow model. Where there is little growth in human capital, population growth is tightly linked with economic growth. As the population in the Potterian world stagnates, so does its economy.

Remember that the Solow model predicts that as gains in physical capital slow-down in rich societies, investors from rich economies would invest in poor economies, where they can earn higher returns on their investments. But, as noted above, human capital barriers such as ignorance and a poor education system prevent them from taking advantage of such opportunities. Instead of investments flowing from the Potterian economy to the Muggle world, it is the Muggles who migrate into the Potterian economy. This would in itself be an economic boon, but the assimilation process is difficult and complicated.

Interestingly, the fictional Potterian world closely reflects reality, where differences in capital and wealth between the developed and developing world lead to a flow of immigrants from poor to rich societies, rather than a flow of capital from rich to poor countries. In many countries, massive immigration is necessary to maintain the growth of the population, but the immigration also increases racial discrimination, social unrest and harassment of the foreigners by local populations. This nonproductive activity wastes resources and reduces productivity, as workers devote their efforts to destructive rather than productive use.[11] In the Potterian world, this ultimately leads to a civil war. In the real world, it usually results in racial conflicts, social unrest, and a struggle over jobs between locals and immigrants. Violent riots and the success of anti-immigrant parties in Europe in 2000–2009, offer a modern day example of this type of problem. These types of negative sentiments towards immigrants are more common and more widespread in depressed economies. The Potterian economy does not grow, it does not expand, and thus the Potterians' negative attitude towards the "foreigners" persists, as expected.

Investment in Physical Capital

As we have seen, improvements in human capital, technology and population growth play an important role in determining the growth path of an economy. Another factor that affects economic growth is the growth rate of the stock of physical capital.[12] Because the term "physical capital" stands for all types of infrastructure, machines, tools, equipment, and other physical factors of production, it would be hard to imagine how a

[11] See Epstein and Nitzan (2006).
[12] See Romer (1987), Bernanke (1987), and Levy (1994).

worker's output could grow without improvements in, and additions to, the stock of capital that is at his disposal.

Frequently in history, improvements in human capital occurred hand in hand with additions to the stock of capital. It is often hard to distinguish one type of improvement from another. But even the most able and knowledgeable worker will not be more effective than his or her predecessor without the right tools.

The Solow model predicts that in the long run, the growth rate of physical capital should equal the growth rate of the population plus the growth rate of the human capital plus the rate of technological progress. We have already seen that neither the population nor the human capital grows in the Potterian economy. Thus, the model predicts that there should be little or no growth in the stock of physical capital. Below we assess whether or not this prediction holds for the Potterian economy.

Very broadly, one can divide all products into two types: "consumption goods" and "investment goods." Consumption goods are things produced for end-consumers. Examples include food, clothing, entertainment, transportation services, and medical services. Investment goods are things used as intermediary inputs in the production of other goods, like buildings, production lines, warehouses, machines, and raw materials. These investment goods are used as the "capital input" into the production process. "Investment" is the process by which capital is accumulated in the economy.

In the Potterian economy, it appears that all productive efforts concentrate on producing consumption goods. There are shops that offer clothes, foods, jokes, newspapers, and many other consumer goods and services that wizards value for their daily use. However, the wizards put far less emphasis on adding to their stock of capital.

Nowhere in the books is there a description of a new factory. Until the Weasley twins open their shop there are not even any new types of products. And even the Weasley twins do not use any novel production techniques or methods. Instead, they use old methods to produce new types of goods. For example, one of their most important innovations is a type of defensive clothing. Yet they did not invent either the magic or the technique which combines the magic with the clothing. They simply identified the needs of consumers in the marketplace.

Nor does it seem that the Weasleys' new products result in any economic growth, because economic growth occurs when people consume more. The Weasleys' shop, however, only makes people switch from shopping in older shops like Zonko's Joke shop to shopping in the Weasleys' new shop, but it does not enable them to increase their total consumption.

In addition to the lack of advancements in production technologies, there are also no improvements or additions to the infrastructure. There are no new schools, new buildings, or new housing. When a new stadium is built for the Quidditch World Cup tournament it is destroyed after the competition is over. Similarly, the wizards do not try to improve their communication systems. The Floo network, for example, has apparently served the wizards for many years, perhaps hundreds of years, but there are no noticeable attempts to improve or upgrade it. For example, it could have saved Molly Weasley her washing troubles if the Floo network were upgraded to use something other than chimneys.

Thus, it seems that the Potterian economy is one where there are no improvements in human capital, and there are also no or little improvements in existing production

technologies. For example, in the Potterian economy there are no new factories that use novel production methods, no new devices that enable better, quicker or more reliable transportation, and no or little addition to existing infrastructures, buildings and services. The only new goods that are produced are consumption goods, and most of these goods are improvements of existing models rather than new products. Thus, it seems that the wizards' economy has reached a high level of technology and welfare, and then stagnates at that level. This stagnation can be seen in the slow growth rate of the population, in the very slow rate of inventions and in the very slow rate of improvements in workers' human capital. For example, although wizards are expected to leave Hogwarts with good knowledge in magic, it seems that the material that they learn there does not evolve over time. For example, in *The Half Blood Prince*, Harry Potter and his classmates study from the same book as Harry's parents, and he even uses a secondhand copy that belonged to one of his father's classmates.

Thus, because the Solow model predicts that physical capital should accumulate at the same rate as the population growth rate plus the rate of technological progress, the Solow model predicts that the growth rate of physical capital and per capita income of the Potterian economy should be very slow or perhaps even zero. The situation described in the books is consistent with this prediction, and the Potterian economy seems to have a very slow or perhaps even zero growth rate.

The notion that economies tend to stagnate once they reach a high level of welfare is not novel, and it may have its origins in observations regarding the fate of the Roman Empire, which collapsed after it reached a very high standard of living. It seems that modern readers of Harry Potter find it relatively natural to believe that very advanced

economies would stagnate once they have reached a high level of welfare. This seems consistent with predictions in the popular press in the beginning of the 2000s which predicted the end of the era in which the Western countries dominated the world. According to people who support this view, people in the highly developed Western economies are not as diligent as people in less developed economies, and as a consequence the growth rate of economies in the western world is very slow relative to the growth rate of some of the emerging economies of South East Asia.

Having described the economy, however, we are not finished. What are the forces that operate within the Potterian economy that make it behave in the way it behaves? Why is the population not growing, capital not accumulating, and education not improving? Is there a causal link between the institutions in the Potterian economy and its failure to grow?[13]

The Potterian Economy as an Economic Model

We have seen that the imaginary Potterian economy behaves in a way that is consistent with the predictions of the Solow growth model. In this section, we try to identify some of the institutional factors that we believe contribute to the lack of growth in the Potterian economy.

One of the limitations of macroeconomic models such as the Solow growth model is that they yield predictions on the macroeconomic level, but they often fail to explain the underlying mechanisms that determine the economy's path. The Solow growth model

[13] We examine these issues more fully in Levy and Snir (2005).

can tell us that economies that do not accumulate capital will suffer slower growth, but it does not tell us why the economy is not accumulating capital. In this section we want to focus on the behavior of institutions in the Potterian economy to try to answer that question. We think this will also shed some light on the perceptions and attitudes of Harry Potter readers toward the interrelationships between financial, social, political and economic outcomes.

The two institutions we will look at are the two that are the most important to development of economic growth: governments and financial markets. Financial markets are critical for providing the resources that stimulate economic growth. Governments can provide infrastructures and regulations that facilitate economic growth, but they can also act as a powerful barrier to economic growth.

Modern governments are powerful. In well-functioning societies, this power is given voluntarily by the people. In return, governments establish various institutions crucial to the economy, such as a system of laws, a court and legal system, police, and certain infrastructure. They may also be charged with enhancing public welfare by promoting various socio-economic goals such as full employment and price stability. On many occasions, however, government officials abuse the power given to them to obtain personal benefits (in terms of power or money) instead of improving the welfare of their people. Public officials motivated by personal gain may spend public money on inefficient projects rather than making investments in profitable and beneficial projects.

Importantly, the larger the government, the more resources will be lost to inefficiency and corruption. Since inefficiency and corruption wastes resources,

economists agree that large governments usually reduce economic growth.[14] This is often known as the "crowding out" effect because when governments supply many services and goods, private entrepreneurs usually cannot compete with the governments and as a consequence they are crowded out of the market. Because governments are often less efficient than private entrepreneurs in inventing new technologies and in supplying goods and services, the crowding out effect usually has negative implications for the growth rates of economies with large governments. For example, it is believed that the crowding out effect is one of the reasons for the collapse of many Communist economies.

In the Potterian world, the government is run by the Minister of Magic, whose role is equivalent to that of a prime minister in a democratic country. But the Minister of Magic is not elected in free elections. Instead, he is appointed by some unspecified process on which the ruling elite seem to have a strong influence. Cornelius Fudge, we learn from the books, was named Minister because he does not have the backbone to oppose the rich and powerful.

The Minister of Magic is in charge of a very large public sector which controls a substantial portion of the Potterian economy. For example, the government is responsible for law-enforcement, international relations, sports, trade regulations, transportation, education, communications, control of nonhuman races (including the behavior of the goblin bankers), nature preservation, the financial system, and almost every other aspect of the economy. Consequently, almost all the wizards mentioned in the book are employed by the Ministry of Magic. The number of people who work at the government

[14] See Hillman (2009), Aidt (2003), Higgins, Levy, and Young (2006), and Higgins, Young, and Levy (2009).

office building is so large that when Harry sees it for the first time in *The Order of the Phoenix* his mouth falls open in astonishment.

The government, therefore, can easily influence the life of almost everybody in the Potterian economy. In *The Half-Blood Prince*, for example, members of the Weasley family express fear when the Minister of Magic comes to visit them on one chilly Christmas Day. Fear of a conflict with public officials is a barrier to free thought and to private entrepreneurship. In the Potterian world, people must avoid conflict with the government simply to keep their jobs.

Note how this fits with what we saw in the earlier parts of this paper, when we described how Hogwarts produces students who are technically competent but unable to think freely and critically. This deficiency in the school system may be directly related to the risk that adult wizards might face if their free thinking puts them in a conflict with the Ministry. The Ministry appears well aware of the importance of controlling the educational process; to force its view on the population, it does not hesitate to interfere in the teaching curriculum and even appoints a High Inquisitor to monitor the curriculum and to ensure that none of the students express any opinion that differs from the official one.

Another way in which the Potterian government interferes in the marketplace is by setting regulations that make it difficult to develop or offer new products. Percy Weasley's attempt in *The Goblet of Fire* to standardize something as trifling as the thickness of a cauldron bottom is an example of government intervention that limits the options and choices that wizard consumers have. If only few types of cauldrons are authorized, then consumers may not have the option of choosing the one that fits best

their needs, tastes, and incomes. In that case, they will be forced to buy only the models that have received official licenses and authorization.

When rules and regulations become excessive it is difficult for entrepreneurs to innovate. They can try to obtain permits from the appropriate government officials, but this opens the door for corrupt bureaucrats to obtain personal benefits in return for the permits.[15] When, in *The Goblet of Fire*, a senior government official, Mr. Crouch, tries to intervene in favor of a certain importer, he does not hide the fact that he has personal interest in the goods that this entrepreneur plans to import. This kind of corruption appears rife in the Potterian world. People like Lucius Malfoy and his friends do not hesitate to use their money to influence politicians. Ministry officials in *The Order of the Phoenix* are well aware that Malfoy is well connected, and that he is entitled to "favors" because he is "giving generously." Such policies have a strong negative effect on economic growth because they increase the costs of investment.[16] At the extreme, government bureaucracies in the real world are sometimes set up for the sole purpose of extracting bribes from entrepreneurs.[17]

Without the ability to get a permit, the only way entrepreneurs can sell new products is by breaking the rules. This is, in fact, the method the Weasley twins use, but their success in avoiding government intervention may be due in large part to the looming war. In *The Goblet of Fire*, Mrs. Weasley predicts that the twins "will end up in front of the Improper Use of Magic Office" for their commercial activities, and if not for the Ministry's preoccupation with more important matters she might have been right.

[15] See Levy (2007).
[16] See Wei (2000).
[17] See Ades and Di Tella (1999).

The Potterian government is large, inefficient, and corrupt, and thus forms a barrier to economic growth. Because it supplies so many goods and services, and because it regulates so many other goods and services, even the few entrepreneurs in the Potterian economy who would have liked to set a new business or offer a new good are prevented from doing so by the bureaucracy. Thus, the crowding out effect in the Potterian economy is very strong, and therefore it might be one of the main reasons for the slow growth rate.

Another inefficiency of the wizards' government is caused by the fact that it is controlled by incumbent elite of wizard society, it encourages the status quo and discourages change. If entrepreneurs can succeed and climb up the social and economic ladder, the existing elites may lose some of their power and influence. Thus, in *The Order of the Phoenix* we are told explicitly that the rich and powerful wizards buy and control senior officials in order to "delay laws" that they "don't want passed."

Moreover, in *The Deathly Hallows*, the structure of the government allows Voldemort and his supporters to gain control by bringing a few senior officials to support their side. Once they secure their control on these officials, the fear from a conflict with senior ministry officials forces all the other members of society to accept the government's instructions, even when these instructions conflict with their own private opinions and norms.

The Potterian world also offers a perspective on the difficulties of reforming large governments in order to make them more efficient. Because it is so large, the Potterian public sector is able to offer job security to everybody, even to the most inefficient—such as Bertha Jorkins, who in *The Goblet of Fire* disappears for a month without anyone

getting worried, because she "got lost plenty of times." The lower- and middle-class wizards have little interest in opposing the government because it provides a job security as well as social, health and entertainment services. The Potterian public sector is also so large and has so much influence over every aspect of life that no individual wizard can realistically oppose it. Even Professor Dumbledore, the most powerful character in the Harry Potter books, has to leave his office and flee in *The Order of the Phoenix* when his opinions bring him into conflict with the Minister of Magic.

Under these circumstances, the government in the Potterian world would oppose actions that would promote economic growth. The rich wizards oppose any change that could promote economic growth because it might erode their power, while the rest of the wizard world—which might be better off with more growth—is too dependent on the system to force the government to change. The result is that the government would consistently oppose entrepreneurial activity, educational reform, and immigration—and will likely stick to those policies no matter how much the economy stagnates.

The second type of institution a society needs for economic growth is some mechanism that facilitates the flow of funds from investors to entrepreneurs. Entrepreneurs who want to improve production need money to invest in buying equipment, hiring workers, and so forth. But it is often the case that entrepreneurs with good investment ideas do not have the money to carry out their plans. In such cases they must look for investors who would agree to put some money in their project, either as a loan or in exchange for profit sharing in the future (for example, by means of issuing and selling stocks or shares), when the project starts to yield profits.

In modern economies, the role of matching entrepreneurs who look for funds with people who are willing to provide funds is filled by banks and stock exchanges. When people buy stocks and bonds, they become investors who transfer their money to entrepreneurs who run the firms that issue those stocks and bonds, and who use the money to invest in the firm. In return, the stock and bond buyers receive dividend and interest payments, respectively. Commercial banks and other credit institutions play a similar role, although in a different guise. Banks collect money from savers and then loan the money to entrepreneurs who pay it back with interest to the bank. The bank pays a portion of these interest receipts to the savers, and keeps the remainder of the interest as a profit.

These types of institutions do not exist in the Potterian economy. There is no stock exchange, and therefore Potterian investors cannot raise funds directly from the public. The monopoly bank, Gringotts, does not offer loans and does not pay interest. It is used by wizards as means for safekeeping their money, but wizards do not deposit money in interest-bearing saving accounts, where it can be lent out, but in vaults. The bank apparently makes its profits from funding gold-hunting expeditions, by recovering money that was already used in the economy. The Potterian banking system does not offer investment funding opportunities, and thus it does not encourage production of new goods and services that would bring about economic growth.

People who are in need of extra gold, therefore, have two main options. First, they can turn to usurers who are willing to give loans in exchange for very high interest, and who use very cruel means to make sure the loans are paid back. For example, when Ludo Bagman cannot pay back a loan that he took, he has to resign his job and flee. Thus,

entrepreneurs who may have a plan for a small business might not consider seriously the option of taking a loan. Second, the entrepreneur can find some individual with deep-pockets that is willing to invest or make a loan. The problem is that most of the money in the Potterian economy is held by the ruling elites, and these wizards, as we have seen, are not interested in helping poor entrepreneurs succeed. It is therefore unlikely that an entrepreneur without personal wealth would be able to implement his plans, no matter how good and promising his project is. This is illustrated by the Weasley twins, who in *The Goblet of Fire* even consider gambling as a means of financing their shop. The Weasley twins are, however, lucky, because they have a friend who wins a large sum of money and gives it to them as a gift. That allows them to start their business, but the fact that they are the only people who open a shop in Diagon Alley in many years suggests that most wizards do not have similar luck.

The Potterian economy highlights the importance of political and financial institutions in determining economic growth. The Solow growth model predicts very little growth for Harry Potter's world, and the main reason for that lack of growth is institutional. The government is large and inefficient and the bureaucracy is so cumbersome that it prevents entrepreneurs from offering new products. At the same time, there is a total lack of financial markets in which entrepreneurs can raise funds. The large and inefficient government, combined with the lack of financial markets, brings about stagnation of the Potterian economy.

How is this relevant? It turns out that real-world economies that resemble the world of Harry Potter find themselves developing in much the same way. Societies that do not experience economic growth tend to develop elites whose vested interests may be

harmed by change. These elites act to minimize reforms and development that could jeopardize their dominant position. Societies with entrenched elites who oppose change, without financial markets, and without good education systems will see no economic growth.

Conclusions

From the popularity of the Harry Potter books, it seems that the Potterian economy makes perfect sense to readers. That the readers of the series do not find it logically implausible suggests that the Potterian economy can teach us something about the way that these readers perceive their own environment. The stagnation of the Potterian economy may reflect people's perceptions of their own situation in many of the world's leading countries, where government has grown, population growth is shrinking, and economic growth is low. It is interesting that even in a book that describes an economy that uses magic as its main production technology, slow population growth and slow rate of technological progress are associated with slow economic progress. We take this as an indication of the strength of the basic intuition behind the Solow model which seems to appeal to both professionals and layman alike.

The government in the Potterian world offers job-security, health, education and other public services to all. It offers a stable economy, so there are no unexpected macroeconomic shocks. Until the official declaration of the war in *The Half Blood Prince*, the Potterian economy has apparently remained very stable, as there were no noticeable changes in the quantity, quality or prices of the goods offered. This situation

seems to be convenient to most middle class wizards. Even Mr. Weasley, who is frequently critical of the Ministry, is proud to be a civil servant and sees his career (and those of his children) as serving the public good.[18] In this respect, the books seem to reflect the favorable attitudes of readers to the role of large governments in managing the economy. The achievements of the Ministry, such as full employment, stability and universal health care are likely to be attractive to many readers, especially to those favoring the model of a welfare state.

At the same time, however, the books are critical of the way that the system interferes with people who want to advance in life. Mud-bloods are discriminated against. Elves are enslaved. Even purebloods like Mr. Weasley, who do not have the right connections, are stuck in the bottom of the social ladder and in ordinary circumstances would be unable to advance. Advancement in the Potterian world seems to be based on connections with the ruling elites, not necessarily on one's ability, as seen by the circle of influence that Professor Slughorn in *The Half Blood Prince* tries to cultivate with his student club.

We read the books as suggesting that the price the Potterian economy pays for stable employment, income, and production, is low social mobility, no economic growth and inefficient bureaucracy that interferes with everyday life. Readers seem to empathize with the powerful public sector that takes care of everyone, and at the same time, they object and fear the corruption, cronyism and restrictions on liberty that accompany it. The impression that readers find this conjunction plausible gives us some interesting insights on how they perceive their own world and its possible future.

[18] See Delfgaauw and Dur (2008).

Before we close, there is a puzzle about the Potterian economy yet to be explored. The reader may have noticed that something important has been omitted in our discussion of government, financial markets, and economic growth. Over the course of seven books there is not a single mention of *taxes* being collected by either the Ministry of Magic or by any local authority—despite the fact that the Ministry is the largest employer in the Potterian economy and it finances many activities that require money. The fact that wizards do not complain about the burden of taxes is a puzzle that deserves further research.

References

Ades, Alberto and Rafael Di Tella (1999), "Rents, Corruption and Competition," ***American Economic Review*** 89(4), 982–993.

Aidt, Toke (2003), "Economic Analysis of Corruption: A Survey," ***Economic Journal*** 113, F632–F652.

Bernanke, Ben (1987), "Comments on Romer," ***NBER Macroeconomics Annual*** 2, 202–205.

Braudel, Fernand (1979), *Afterthoughts on Material Civilization and Capitalism* (New York, NY: Penguin Books).

Engel, Charles and John Rogers (1996), "How Wide is the Border," ***American Economic Review*** 86(5), 1112–1125.

Epstein, Gil and Shmuel Nitzan (2006), "The Struggle over Migration Policy," ***Journal of Population*** Economics 19, 703–723 (2006).

Guiso, Luigi, Paola Sapienza, and Luigi Zingales (2004), "Cultural Biases in Economic Exchange," National Bureau of Economic Research, Working Paper No. 11005.

Higgins, Matthew, Daniel Levy, Andrew Young (2006), "Growth and Convergence across the United States: Evidence from County-Level Data," ***Review of Economics and Statistics*** 88(4), 671–681.

Higgins, Matthew, Andrew Young, and Daniel Levy (2009), "Federal, State and Local Governments: Evaluating their Separate Roles in US Growth," ***Public Choice*** 139, 493–507.

Hillman, Arye (2009), *Public Finance and Public Policy, Second Edition* (New York, NY: Cambridge University Press).

Knight, Frank (1965), *The Economic Organization* (Chicago, IL: The University of Chicago Press).

Levy, Daniel (1990), "Investment-Saving Comovement, Capital Mobility, and Fiscal Policy," UC-Irvine Economics Paper No. 90-91-04.

Levy, Daniel (1994), "Output, Capital, and Labor in the Short and Long Run," ***Southern Economic Journal*** 60, 946–960.

Levy, Daniel (1995), "Investment-Saving Comovement under Endogenous Fiscal Policy," ***Open Economies Review*** 6, 237–254.

Levy, Daniel (2000), "Investment-Saving Comovement and Capital Mobility: Evidence from Century-Long US Time Series," ***Review of Economic Dynamics*** 3, 100–136.

Levy, Daniel (2007), "Price Adjustment under the Table: Evidence on Efficiency-Enhancing Corruption," ***European Journal of Political Economy*** 23, 423–447.

Levy, Daniel and Avichai Snir (2005), "Potterian Economy: Popular Perceptions and Political Economy in the Contrived World of Harry Potter," Bar-Ilan University and Emory University Working Paper, available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=809465.

Lewis, Karen (1999), "Trying to Explain Home Bias in Equities and Consumption," ***Journal of Economic Literature*** 37(2), 571–608.

McCallum, John (1995), "National Borders Matter: Canada-US Regional Trade Patterns," ***American Economic Review*** 85(3), 615–623.

Mokyr, Joel (1992), "Technological Inertia in Economic History," ***Journal of Economic History*** 52(2), 325–338.

Nitsch, Volker (2000), "National Borders and International Trade: Evidence from the European Union," ***Canadian Journal of Economics*** 33(4), 1091–1105.

Romer, Paul (1987), "Crazy Explanations for the Productivity Slowdown," ***NBER Macroeconomics Annual*** 2, 163–202.

Solow, Robert (1956), "*A Contribution to the Theory of Economic Growth*," ***Quarterly Journal of Economics*** 70(1), 65–94.

Solow, Robert (1957), "*Technical Change and the Aggregate Production Function*," ***Review of Economics and Statistics*** 39(3), 312–320.

Tversky, Amos and Daniel Kahneman (1974), "*Judgment under Uncertainty: Heuristics and Biases*," ***Science*** 185, 1124–1131.

Young, Andrew, Daniel Levy, and Matthew Higgins (2004), "Many Types of Human Capital and Many Roles in US Growth: Evidence from County-Level Educational Attainment Data," Bar-Ilan University and Emory University Working Paper (2004), available at www.economics.emory.edu/Working_Papers/wp/levy_04_02_cover.htm.

Wei, Shang-Jin (2000), "Local Corruption and Global Capital Flow," ***Brookings Papers on Economic Activity*** 31(2), 303–354.

Delfgaauw, Josse and Robert Dur (2008), “Incentives and Workers’ Motivation in the Public Sector,” ***Economic Journal*** 118, 171–191.