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Citizenship Canada

Research Interests Macroeconomics
Monetary Economics
Development Economics

Teaching Interests Macroeconomics
Monetary Economics
Development Economics
Econometrics

Education

2007 PhD, Economics, University of Toronto, Ontario, Canada (expected 06 – 2007)

Dissertation: Essays on Money, Search and the Underground Economy

Committee: Andres Erosa, Miquel Faig, Shouyong Shi (chair)

2001 MA, Economics, University of Waterloo, Ontario, Canada

1998 BA, Accounting and Economics, University of Ghana, Ghana, First Class Honours

Academic Awards

2007 Lawrence & Tracey Smith Bursary, University of Toronto

2005 – 2007 Doctoral Thesis Completion Grant, University of Toronto

2001 – 2005 Graduate Fellowship, University of Toronto

2000 International Graduate Scholarship, University of Waterloo

Research Papers

Inflation and the Underground Economy (2006), Job Market Paper
Under review at the Journal of Monetary Economics

Commodity Money with Divisible Goods (2004)

Optimal Audits with Search and Tax Evasion, (In Progress)

Flat Tax and Wealth Distribution: Examining the role of the tax-evading sector,
(In Progress)

Professional Experience

- 2001 – 2006: Teaching Assistant
University of Toronto (2001 – 06),
Ryerson University (2003 – 05)
University of Waterloo (2000 – 01)
- 2005 – 2006: Research Analyst (volunteer position)
Our Place Community of Hope, Toronto, Canada
- 1998 – 2000: Finance Officer
Network Computer Systems (ISP & Network Operator)
Accra, Ghana
- 1996 – 1997: Audit Adjunct (summer internships)
PricewaterhouseCoopers (previously Coopers & Lybrand), Accra, Ghana
- 1993 – 1994: Mathematics and Science Teacher, Ghana Junior Secondary School, Aflao, Volta
Region, Ghana

Selected Conference and Seminar Presentations

- Major Presentations
- 05/2006 Canadian Economics Association Meeting, Concordia University, Montreal
“Money, Taxes, Audits and the Underground Economy” – Previous version of
“Inflation and the Underground Economy”
- 03/2006 University of Pretoria Academic Seminar Series, University of Pretoria, South
Africa
“Money, Taxes, Audits and the Underground Economy”
- 06/2004 Canadian Economics Association Meeting, Ryerson University, Toronto
“Commodity Money with Divisible Goods”
- Major Conference Participations
- 2005 & 2006 Bank of Canada Research on Money and Markets Workshop, Toronto
- 05/2005 Canadian Economics Association Meeting, McMaster University, Hamilton
- 11/2003 Canadian Macroeconomics Study Group, University of Toronto, Toronto

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References

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Dissertation Abstract

Essays on Money, Search and the Underground Economy

Inflation and the Underground Economy (Job Market Paper)

Under review at the Journal of Monetary Economics

Observations and Questions

One of the traditional arguments advanced for positive inflation is that in the prevalence of a tax-evading underground sector, governments should rely heavily on seigniorage financing. Inflation however imposes its own welfare costs. What then is the optimal rate of inflation? In particular, is the optimal rate of inflation always high, given a high degree of tax evasion? For example, Koreshkova (2006) finds that 60% annual inflation may be optimal for an economy with 40% tax evasion.

Seigniorage supplements government income, requiring less emphasis on regular (formal sector) taxes. A lower tax rate in turn encourages firms to formalize, thereby reducing the underground economy. The existing theoretical literature supports this negative relationship between changes in the inflation rate and changes in the underground economy. The data on the other hand is far less conclusive. Can an environment with bilateral trade reconcile with the data?

Bilateral Trade

In this paper, I study the optimal rate of seigniorage in an economy characterized by bilateral trade and a tax-evading underground sector. With bilateral trade, the rate of congestion of buyers can be different between the formal and underground markets. If the formal market is more congested with buyers, inflation causes households to divert buyers to the underground market since that market offers a higher likelihood of trade. This is optimal behaviour because inflation brings renewed urgency to spend money. As buyers move underground, turnover of underground goods increase relative to the formal sector. Since inflation increases tax evasion, the incentive for seigniorage financing reduces. Optimal policy includes inflation rates as low as 1.48% per annum when calibrated to Peru. This is in contrast with the conventional wisdom that with a 44% rate of tax evasion, the government of Peru should rely heavily on inflation tax. The recommended rate of 1.48% is close to the 1.6% realized in Peru in 2005. On the other hand, when the underground sector is more congested for buyers, inflation can decrease tax evasion and seigniorage financing becomes more attractive. The optimal inflation rate is as high as 42.69% per annum for Peru, which may offer some explanation for the high rates of inflation observed in that country from the mid 1970s up to the mid 1990s.

With bilateral trade, changes in inflation can increase or decrease the underground economy, contrary to the strictly negative relationship found in the theoretical literature. This reconciles well with some empirical evidence presented in the paper.

Contributions and Extensions

This paper provides strong micro foundations for the underground economy by allowing agents to trade in anonymous bilateral meeting, the more plausible trade arrangement that facilitates tax evasion. I show that the matching mechanism can have pivotal implications for the optimal rate of inflation. I make a significant contribution in integrating fiscal policy instruments into the monetary search literature, following recent progress by Aruoba, Waller and Wright (2006). Inflation can increase the consumption of higher-quality (formal sector) goods and can be welfare-improving, unlike in Peterson and Shi (2004). The model is flexible and allows applications to other sectoral divisions of the economy. Capital can also be introduced to permit traditional neoclassical growth applications.

Optimal Audits with Search and Tax Evasion

In this paper, we study the optimal trade-off between two sources of government finance: (i) taxes on formal sector output and (ii) output seizures in the underground economy (the audit rate). Audits are assumed costless to implement and that formal and underground goods are of equal quality. If an auctioneer sets the price in each market, then the optimal policy equates the tax rate to the audit rate. Next, we remove the auctioneer from the underground market by assuming that underground traders must invest in costly search in order to find the goods that they desire. An increase in the tax rate reduces formal sector output, but the same percentage increase in the audit rate reduces underground output by an even larger margin. This is because an increase in the audit rate does not only reduce output within each trade encounter; it also reduces the aggregate number of trade encounters as agents search less. We find that the optimal audit rate is low, as consistent with data. Government financing is therefore mainly via taxation. If underground goods are inferior to formal sector goods, the optimal audit rate can rise, but this is promptly reversed if we allow for costly audits.

Commodity Money with Divisible Goods

In the early economy, money took the form of commodities which had peculiar properties. What economic conditions can explain how certain goods became exalted to the status of mediums of exchange? Kiyotaki and Wright (1989) was the first to attempt an answer to this question using fully rational agents, strategic behavior and in a dynamic economy with random pair-wise matching. In their economy with three types of indivisible goods, they identify a “Fundamental equilibrium” in which the good with the lowest storage cost emerges as money. In their “Speculative equilibrium”, the good with the highest storage cost joins in as money because it may deliver a higher likelihood of trade.

I generalize their results by removing the restriction of goods being indivisible. When we allow for full divisibility, both equilibria can still be identified. Therefore, the existence of these equilibria does not depend on goods being indivisible. I find that once goods are divisible, the two equilibria can coexist, unlike in the earlier paper. This enables welfare comparisons. The speculative equilibrium is always a better lubricated economy with a higher quantity of commodity money circulating. When goods with high storage costs start to circulate, they crowd out the circulation rate of goods with lower storage costs, resulting in a version of Gresham’s law. A direct result is that the speculative equilibrium is not Pareto-superior to the fundamental equilibrium. Unlike in the earlier paper, I find a nontrivial distribution of commodity money stocks. Since money is the only state variable, this distribution affects welfare and the extent of lubrication of the economy.