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International factor mobility, informal interest rate and capital market imperfection: A general equilibrium analysis☆

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ABSTRACT

This paper makes an attempt to provide a theory of determination of interest rate in the informal credit market in a less developed economy in terms of a three-sector static deterministic general equilibrium model. There are two informal sectors which obtain production loans from a monopolistic moneylender and employ labour from the informal labour market. On the other hand, the formal sector employs labour at an institutionally fixed wage rate and takes loans from the competitive formal credit market. We show that an inflow of foreign capital and/or an emigration of labour raises (lowers) the informal (formal) interest rate but lowers the competitive wage rate in the informal labour market when the informal manufacturing sector is more capital-intensive vis-à-vis the informal agricultural sector. International factor mobility, therefore, raises the degrees of distortions in both the factor markets in this case.

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1. Introduction

There exists financial dualism in less developed countries (LDCs) like India, Pakistan, Bangladesh etc. with two different credit markets — formal credit market consisting of banks, co-operatives etc. and informal credit market consisting of professional moneylenders, traders, landlords etc. The formal credit market is competitive and supplies credit to the organized production sectors of the economy at relatively low rates of interest. On the contrary, the informal credit market is characterized by high degrees of imperfection and is found to be the major source of credit to the unorganized production sectors like agriculture, urban informal sectors etc. Professional moneylenders, having local monopolistic power, charge exorbitantly high rates of interest[1] to their borrowers.

The theoretical literature dealing with the interaction between the formal credit market and informal credit market consists of two groups. Contributions like Chaudhuri and Gupta (1996), Gupta and Chaudhuri (1997), and Chaudhuri (1998, 2001, 2004) analyze interaction between the two credit markets in the presence of corruption in the loan delivery system in the formal credit market. Rent-seeking behaviour of the formal lender lowers the availability of formal credit and thus a demand for informal credit is created. On the other hand, works like Bose (1998), Hoff and Stiglitz (1996), Floro and Ray (1997), Jain (1999) and Chaudhuri and Ghosh Dastidar (2011a,b) consider vertical linkages between the two credit markets. Here informal sector lenders act as financial intermediaries between the formal credit agency and the final borrowers of credit. However, models belonging to this literature are built in static one period partial equilibrium framework and deal with a pure agrarian economy. Hence these models neither can focus on the simultaneous determination of all factor prices nor can analyze the effects of various exogenous changes taking place in the different non-agricultural sectors of the economy.

A complete static one period deterministic general equilibrium model incorporating the interaction between these two credit markets as well as the interdependence between the urban development and the rural development is found in Gupta (1997). This model provides a framework to analyze the effect of various urban

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[1] The informal interest rate could be as high as 40 per cent or even 120 per cent per annum. See Basu (1998) and Bedbak (1986) in this context.

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development policies on the relative development of these two credit markets.[2] However, Gupta (1997) assumes informal capital to be mobile between the urban informal manufacturing sector and the informal rural sector and keeps formal capital[3] to be specific to the formal manufacturing sector. The formal manufacturing sector in that model faces a fixed high wage; but the wage rate is flexible in the two informal sectors.[4] Furthermore, the two capital markets in that model are completely disintegrated and there is no scope for formal credit to flow into the informal credit market. Also the informal credit market is assumed to be competitive in that model while there are several theoretical and empirical works emphasizing the imperfection in this credit market.[5] Credit transaction is often interlinked with other transactions like output transactions and labour transactions. Professional moneylenders have local monopoly power. Lenders have imperfect information about their borrowers. Also the literature does not comprise of any general equilibrium models that provide a theory of determination of the informal interest rate starting from the behaviour of the informal sector lender in an imperfectly competitive credit market. An informal lender borrows funds from the formal credit market and relends it to the informal borrowers; and in the process maximizes net interest income. So a part of the formal credit enters into the informal credit market; and hence two credit markets are not completely disintegrated. The limitations in the model of Gupta (1997) justify the need for further research in this area introducing imperfection in the informal credit market as well as integration between the formal and the informal credit markets.

The present paper develops a static general equilibrium model of a small open economy consisting of three sectors — a formal, an informal and a rural (agricultural). The informal sector produces a non-traded intermediate good for the formal sector while the other two sectors produce two internationally traded final commodities. The formal credit market that supplies capital to the formal sector is assumed to be competitive like Gupta (1997). However, we introduce imperfection in the informal credit market that supplies capital to the informal and rural sector producers. The informal lender is a price maker in the informal credit market. Also the two credit markets are not disintegrated and capital can flow from one market to the other because the informal lender obtains capital from the formal credit market. In Gupta (1997), the supply of capital to the informal sector is perfectly inelastic. Any inflow of foreign capital necessarily goes to the urban formal sector in Gupta (1997)[6] while in the present model it may flow into both credit markets. In Gupta (1997), labour moves from the rural sector to the informal sector following the Harris and Todaro (1970) migration mechanism. However, in the present model, labour is perfectly mobile.

The present analysis derives some interesting results that are new in the theoretical literature on informal credit market. An inflow of foreign capital, given the endowment of labour, unambiguously raises both the price of the informal sector's product and the informal interest rate but lowers the formal interest rate as well as the wage rate in the informal labour market. Similar results are obtained when an emigration of labour takes place given the capital endowment of the economy. So either the foreign capital inflow or the emigration of labour aggravates the extent of formal–informal wage gap as well as the interest rate gap between the two credit markets. So, degrees of distortions in both the factor markets are increased following inflows of foreign capital and/or emigration of labour.

The paper is organized as follows. The model is described in Section 2. Subsection 2.1 analyzes the behaviour of the monopolistic lender who is the only source of capital in the informal credit market. Subsection 2.2 describes the equational structure of the general equilibrium model. Section 3 presents the comparative static effects with respect to changes in capital and labour endowments. Finally, concluding remarks are made in Section 4.

2. The model

We consider a small open developing economy with three production sectors: one formal sector and two informal sectors. One of the two informal sectors (sector 1) produces an internationally traded commodity, X_1, whose price, P_1, is internationally given. However, the other informal sector (sector 2) produces a non-traded intermediate good, X_2, for the formal sector. The formal sector produces an internationally traded manufacturing commodity, X_3. Labour is homogeneous and measured in labour time unit. Capital is also homogeneous and is measured in terms of machine hour. Capital and labour are the two primary inputs in each of these three sectors. Factor prices and the price of the non-traded good are measured in terms of a traded good. Markets other than the formal sector labour market and the informal sector credit market are perfectly competitive. The representative firm in each of these three sectors maximizes profit. Factor endowments are given exogenously. Labour and capital move freely across different sectors. There are imperfections in the market for labour in the formal sector. Workers in sector 3 are unionized and they receive a high fixed wage, W^*, while their counterparts in the two informal sectors earn only a flexible competitive wage, W with $W^* > W$.[7] Workers first try to get employment in the formal sector as it offers a high wage. Those who are not successful are automatically absorbed in the two informal sectors owing to complete flexibility of the informal wage rate, W. The two informal sectors do not have any access to the formal capital market where the rate of return to capital is denoted by r; and hence are compelled to fall back upon the informal credit market, monopolized by a moneylender, where the interest rate is denoted by R. The per-unit requirement of the intermediate input in sector 3 is assumed to be technologically fixed.[8,9] Sector 1 and sector 2 together form a Heckscher–Ohlin sub-system (HOSS) because both informal capital and labour are perfectly mobile between these two sectors.[10] Sector 2

[2] This treatment of dichotomy between the formal–informal credit markets is also available in Chaudhuri (2003) which studies the welfare consequences of different liberalized economic policies in a small open economy setting.

[3] Capital means working capital borrowed from the capital market.

[4] There exists a substantial literature on informal manufacturing sector which consists of Chandra and Khan (1993), Grinols (1991), Datta Chaudhuri (1989), Gupta (1994, 1997), Chaudhuri (2006, 2005, 2004, 2003, 2000a), Chaudhuri and Mukhopadhyay (2009), Chaudhuri and Banerjee (2007), Chaudhuri and Dwibedi (2006, 2007), and many others.

[5] See for examples, Bhaduri (1977), Bardhan (1984), Bardhan and Rudra (1978), Sarap (1991), Bottomley (1975), Basu (1984, 1998), Basu and Bell (1991), Bell (1988), Bose (1998), Chaudhuri (2004, 2001, 2000b, 1998), Chaudhuri and Ghosh Dastidar (2011a,b) and many others.

[6] Chaudhuri (2003) model also shares the same limitation.

[7] Firms in the formal sector face unionized labour market. One of the most important roles of the labour unions is to bargain with their respective employers in respect for the betterment of the working conditions. Through offer of negotiation, threat of strike, actual strike etc. the trade unions exert pressure on the employers (firms) in order to secure higher wages, reduced hours of work, share in profits and other benefits. Organized workers in large firms leave no stones unturned so as to reap wages higher than their reservation wage i.e. the informal sector wage. See Bhalotra (2002) and Chaudhuri and Mukhopadhyay (2009) in this context.

[8] It rules out the possibility of substitution between the non-traded intermediate good and other factors of production in sector 3. Although this is a simplifying assumption, it is not totally unrealistic. In industries like shoe making and garments, large formal sector firms farm out their production to the small informal sector firms under the system of subcontracting. So the production is done in the informal sector firms while labelling, packaging and marketing are done by the formal sector firms. One pair of shoes produced in the informal sector does not change in quantity when it is marketed by the formal sector as a final commodity. Thus there remains a fixed proportion between the use of the intermediate good and the quantity of the final commodity produced and marketed by the formal sector. See Chaudhuri and Mukhopadhyay (2009) in this context.

[9] Even though the non-traded input–output ratio (a_{23}) in sector 3 is technologically given, labour and capital are substitutes and the production function displays the constant returns to scale property in these two inputs.

[10] Heckscher–Ohlin sub-system (HOSS) in the general equilibrium model of a small open economy is defined as a sub-system consisting of two sectors with at least two intersectorally mobile factors of production. However, we are not using this model to explain international trade following Heckscher–Ohlin theory.

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