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Why governments may opt for financial repression policies: selective credits and endogenous growth

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ABSTRACT

Financial repression policies (lowering real interest rates, selective credits and other restrictions on financial markets, products and institutions) have been widely discussed in the economic literature during the last four decades. A key question is 'why governments would opt for financial repression policies in the first place'? As an answer, governments' desire to obtain rents from the financial system or to manage public debt servicing have been suggested as the typical underlying incentives. It has been argued in 1970s and 1980s that especially in developing economies, financial repression would have negative consequences on economic growth and financial development, although more recently financial repression policies are back as governments in the developed economies aim at obtaining low-cost funds from the financial markets in the aftermath of the global financial crises.In this article, a simple two-sector model is set up in order to show that governments may institute financial repression policies to internalise production and investment externalities. It is shown that such a government policy is welfare improving and abolishment of selective credits may cause welfare loss. The model also provides a case where financial policy is designed according to the priorities of industrial policy.

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1. Introduction

Financial Repression policies – in the form of ceilings on nominal interest rates, selective credits and other restrictions on financial markets, products and institutions – have been widely discussed in the economic literature during the last four decades. Moreover, these discussions have played a significant role in the liberalisation of financial markets in numerous countries since 1980s.

An obvious key question is 'why governments would opt for financial repression policies' in the first place. Governments' desire to obtain rents from the financial system or to manage public debt servicing are suggested as the typical underlying incentives. Along these lines, McKinnon (1973) and Shaw (1973) have argued that, especially for developing economies, financial repression would have negative consequences on economic growth and financial

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development. More recently, Reinhart (2012) have argued that financial repression policies are back, as governments in the developed economies aim at obtaining low-cost funds from the financial markets in the aftermath of the global financial crises.

On the other hand, the notion that financial repression policies retard growth and development have not been corroborated by historical developmental experiences of countries like Japan and South Korea. The latter have used repressionist policies, including selective credits to accelerate industrialisation and economic growth.

We argue in this article that selective credit policies, as a type of financial and industrial policies, may have desirable welfare consequences. To elaborate on these issues, we utilise a simple model with two available production technologies, producing the same- and the only-consumption-investment good. One of the technologies is assumed to consist of a standard Constant Returns to Scale (CRTS) production function with no exogenous technological development, while the other, the 'modern' or 'non-traditional' technology, includes a positive externality from learning in the fashion proposed by Romer (1986) described here later. The model shows how a welfare improving financial policy, which may be called 'repressionary', might be employed by the government as a tool of industrial policy.

In the next section, a literature survey sets the stage for our model. In section III, the model and its key implications presented. Section IV concludes the article.

2. Overview of the literature

This section provides a brief literature survey on the financial repression policies.

2.1. Origins

Financial repression and liberalisation – and their relationship to economic development – have been extensively debated in the literature during the last four decades, especially after publication of the books by Ronald McKinnon (1973) and Edward Shaw (1973). In these two books, the main idea put forward is that the neoclassical relationship between money and growth, elaborated by Tobin (1965), does not hold in the context of developing countries where the financial markets are not developed adequately. Another point of departure was the 'financial development' literature represented by Cameron (1967) and Goldsmith (1969).

With these two roots, early 'financial liberalisation' literature argued that causality ran from financial development to economic growth; and that, given the dominance of commercial banking in underdeveloped countries, ceilings on deposit rates (and/or lending rates) historically hindered financial development (primarily by constraining the stock and flow of savings) and thus growth in the real economy.

Though the early discussion was based on long-term growth, Kapur (1976) gave also a short-term stabilisation flavour, arguing that stabilisation policies in developing countries should incorporate removal of interest rate ceilings and other financial liberalisation moves to eliminate possible recessionary effects of the standard stabilisation policies.

2.2. Definition of financial repression

There seems to be some divergence in the literature about how financial repression is defined. A narrow definition would simply refer to existence of ceilings on deposit and/or

lending rates. A broader definition, on the other hand, would refer to governments' intervention in the price formation in financial markets with various other tools.[1] For example, the government can opt for preventing the development of certain financial institutions in favour of others (like banks instead of stock exchanges) or conducting selective credit schemes.

2.3. Understanding why governments would opt for financial repression policies: earlier and recent approaches

If there is financial repression in an economy, there should be some government action behind it with measures leading directly or indirectly to repression. Why then would governments opt for such measures? In the context of developing countries, Fry (1982, p. 732) suggests the following reasons:

1. 'Most developing countries slipped into financial repression inadvertently; the original policy was aimed simply at financial restriction.'
2. 'Financial restriction encourages institutions and financial instruments from which government can appropriate a large seignorage and discourages all others. For example, money and the banking system are favoured and protected; high reserve requirements and obligatory holdings of government bonds can be imposed to tap this source of saving at zero or low cost to the public sector'. Similarly, 'interest rate ceilings are imposed to stifle competition from the private sector. … Foreign exchange controls, interest rate ceilings, high reserve requirements, suppression or non-development of private capital markets, etc. can all increase the flow of domestic resources to the public sector. … Successful financial repression is exemplified by a higher proportion of funds from the financial system being transferred to the public sector'.
3. 'Selective or sectoral credit policies are common components of financial restriction. … The former necessitates the latter. For selective credit policies to work at all, financial markets must be kept segmented and restricted.'

Thus, the main point put forward by Fry (1982) is that financial repression is just a consequence of financial restriction which the government purposefully institutes in order to obtain 'rents' from the financial system. He also mentions that selected credits are part of financial repression policies, but the literature has not elaborated decisively on specific reasons as to why such policies might have been used.

2.4. Financial repression, selective (directed) credits and industrial policy

As recent experiences of East Asian countries have demonstrated, selective credit policies conducted in these countries rather aimed at supporting industries that were targeted by the government. In other words, selective credit policies were conducted according to the priorities of the industrial policy. The support came either in the form of subsidies, i.e., a fiscal tool, or in the form of selective credit policies. With the broader definition of financial repression mentioned earlier, selective credit policies imply financial repression as they indicate direct government intervention in the financial market.

A clear formulation of a similar idea was made by Amsden and Euh (1993), who argued that in Korea, 'financial system operates under the umbrella of an industrial policy'. They further argued that:

The … point is illustrated by the method adopted by the Korean government to channel more credit to small and medium size firms. Instead of granting banks and other financial institutions carte blanche to decide to whom to lend (on the presumption that in the absence of heavy handed government, small- and medium-size enterprises will get their fair share of credit), the government has taken the opposite tack. It has set minimum quotas on the amount of credit that financial institutions must allocate to such firm. (pp. 389–390)

Amsden and Euh (1993) thus propose a view totally opposed to that of Fry (1982) (reasons 1 and 2 above), on possible reasons of repressionary financial policies followed by governments.[2]

On the other hand, Stiglitz (1994), without a formal theoretical model, also emphasises that selective credits have been employed successfully by East Asian economies to target export promotion and technological development as these economies suffered from underdeveloped tax systems while they had public financial institutions as well as conventional banks well positioned to direct credit to well scrutinised sectors where social benefits were high without damaging macroeconomic stability.

2.5. Earlier financial repression models and empirical analysis

Kapur (1976), Galbis (1977) and Spellman (1976) developed earlier financial repression models based on bank finance of investments in fixed or working capital to formalise the ideas of McKinnon (1973) and Shaw (1973). Kapur (1976) aimed at carrying the McKinnon-Shaw results to the short-run stabilisation platform. He assumed a linear production function in capital for a labour-surplus economy. Moreover, he assumes that there is unused fixed capital in the economy, which arises from the shortage of working capital provided to the firms by the banks. The balance sheets of the banks consist of reserves and credits on the asset side and deposits on the liability sides. In line with Fry (1982, 1988), deposits can, with no harm to the general results, be considered as the only monetary asset and thus to constitute the entire money stock.

Such a link between the working-capital constrained real economy and the financial economy naturally relates the money demand of the consumers/savers to growth. A ceiling on deposit rate will reduce the tendency to hold money (deposits). This constraint on the liability side of the banking system balance sheet will lead to a reduction in credit supply. The ensuing reduction in working capital will reduce the growth rate.

Galbis (1977) introduced a two-sector model, more in the spirit of McKinnon. The first sector is the traditional sector, and the second the modern sector. The returns to capital in both sectors are constant, with the return in the second sector higher than that in the first. The existence of the two sectors with constant but differentiated returns to capital is made possible by assuming that the first sector has no access to the bank finance. It can, however, hold deposits. The second sector has access to both bank finance and deposits. However, as it is the only sector that has access to bank credits, the bank deposits that are made by this and the first sector's members are again extended to the members of the second sector.

The first sector holds a portfolio of real (capital) assets and bank deposits according to the relation between the deposit rate and the return to capital in the first sector. Once this

relation is set, the natural consequence is that when the deposit rate is set by the government below the equilibrium value, the deposit holdings in the second sector is reduced, and through the banking system balance sheet constraint this reduces the credit supply in the modern sector leading to reduced investments and growth rate in the economy.

Spellman (1976) specified a neoclassical production function and a capital demand function whose arguments are the return to capital and current income. Assuming that the capital demand function is homogenous of degree one in current income, the ratio of capital to output can be written as a function of the marginal product of capital. The equilibrium capital intensity in the economy is determined by this demand for capital (which has a positive slope in capital intensity) and the marginal product of capital schedule (which has a negative slope in capital intensity) emerging from the specified production function.

The banks are assumed, arbitrarily, to obtain a higher yield from the capital services than the 'self-finance' at each capital intensity. However, the banks are also assumed to bear real factor costs in fulfilling their functions. It is assumed that the return banks provide to their deposit holders (which is the difference between the higher returns from the capital and the real factor costs incurred) is still higher than the self-finance case at each capital intensity level. Spellman then shows, using this new schedule together with the capital demand schedule that interest rate ceilings will lead to under-capitalisation and possibility of a misallocation of the already scarce capital.

Stiglitz (1993) emphasised that, on the savings side, studies on savings indicated little relationship between national savings and interest rates. On the investment side, he argued that low interest rates might bring in two key benefits. Firstly, as Stiglitz and Weiss (1981) underlined:

> … high interest rates adversely affect incentives and the mix of applicants, even when these effects are not so strong as to outweigh the direct benefit of higher interest rates. Even if the government selected projects at random, lowering the interest rate could increase the expected quality of borrowers, and this effect would be even greater if it were assumed that the government had some positive selection capabilities. (p. 40)

Secondly, he argued that financial repression strengthens the equity base of firms by lowering the cost of capital. Higher equity would lead to demand for investments with higher expected returns as well as manageable risks more of their own capital would be at stake in the case of bankruptcy. Likewise, Hellmann, Murdock, and Stiglitz (2000) emphasised positive effects of lower interest rates on firm risk-taking behaviour ultimately producing positive effects from financial repression.

Developing the ideas of Stiglitz (1993), Arestis and Demetraides (1999) argued that when perfect competition and complete symmetry of information assumptions are dropped, as for example in the case of developing economies, financial repression policies might lead to more efficient outcomes.

Subsequent empirical analysis by Arestis and Demetriades (1997) and Demetriades and Luintel (2001) indicated that in South Korea, financial repression policies had played a positive role. The results of Li (2001) also indicated a positive effect of financial repression on growth performance in the case of China. Yulek (1997) also underlines that 'Japanese financial policies during the so called High Growth Period (1953–1973) stand at sharp contrast with the presumptions' of McKinnon (1973) and Shaw (1973) with repressed interest rates and that Japanese financial policies during the HGP display 'heavy, distortionary and purposeful government intervention in the financial markets.'

2.6. The recent return of financial repression into the literature

More recent handling of the subject in the literature has been around two axes. Firstly, a number of scholars considered post 2007 global financial crises as a new era of financial repression policies where governments utilise them for debt reduction purposes. Following the global financial crises of 2007–2008, falling nominal interest rates leading to negative real interest rates have captured attention. The reasons put forward for why governments opt for financial repression are similar to Fry's explanations above. Reinhart and Sbrancia (2015) defined financial repression, as 'directed lending to government by captive domestic audiences (such as pension funds), explicit or implicit caps on interest rates, regulation of cross-border capital movements, and (generally) a tighter connection between government and banks.' They argued that financial repression is now being utilised by governments as a deliberate debt-reduction tool.

Reinhart (2012) further argues that the regulatory arrangements in the banking sector in 1930s had led to lower real interest rates during 1940s to 1970s, by which, the ensuing financial repression caused a 'liquidation' of public debt. She likeness the 'resurgence of financial repression in the wake of the 2007–2009 financial crises alongside the surge in public debts in advanced economies to that era and foresees a long period of financial repression ahead.

These and similar influential research by Reinhart and her co-authors such as Reinhart, Reinhart, and Rogoff (2012), Reinhart and Rogoff (2011) triggered a number of other studies. Chari, Dovis, Kehoe, and Martin (2014) further the work above by defining financial repression as 'regulation imposed by government to banks and other financial intermediaries to force them to hold more government bonds than they would absent such regulation.' They develop a theoretical model which suggests that financial repression (forcing banks to hold government debt) may be optimal only if a government cannot commit to repay its debt. They thus conclude that financial repression may be an efficient policy for governments under certain conditions. Aloy, Dufrénot, and Péguin-Feissolle (2014) argue that in the post-WWII France, in the periods of financial repression, the pressure for fiscal adjustment to lower the public debt to GDP ratio was less as lower interest rates reduced debt service costs. Through a counterfactual analysis, they conclude that cost of debt service would have been lower in the post-1980 era had the same financial repression policies followed by the French governments. Fulcher et al. (2014) argue that the British Government had over time also resorted to financial repression policies to manage public debt servicing.

Secondly, as in late 1980s and 1990s, various studies have recently empirically tested the link between financial repression (or financial liberalisation) and economic growth under the McKinnon-Shaw hypothesis. However, one has to note that these recent studies have not considered the welfare effects of financial repression or liberalisation.

In a recent study, Huang and Wang (2011) analysed the impact of financial repression on economic growth during China's reform period concluding that: '(1) on average, repressive policies helped economic growth, thanks probably to the prudent liberalisation approach; (2) But the impact turned from positive in the 1980s and the 1990s to negative in the 2000s, suggesting rising efficiency losses in recent years.'

Xun (2013) argues that financial repression might make it attractive for domestic businesses to invest abroad, thereby triggering FDI outflows. The results of a study by Adnan Hye and Islam (2013) reveal a negative relationship between real interest rates and long-term growth in Bangladesh, thus suggesting that financial repression may increase growth

performance. Tests of the relationship between financial development and growth in Thailand China, Indonesia, Singapore, India and Malaysia by Mukhopadhyay, Pradhan, and Feridun (2011) detect causality from financial development to growth in China, Indonesia, Singapore and India; a bidirectional causality in Thailand but no causality in Malaysia. Xu and Gui (2014) also empirically test a similar hypothesis. Their results indicate that in China, growth effects of financial repression (especially through lower cost of capital) outweigh its negative effects leading to a positive effect on growth on net basis.

2.7. Welfare effects of financial repression policies

Few studies have explicitly concentrated on the welfare effects of financial repression; nevertheless (Jappelli & Pagano, 1999). Based on an empirical study on Thailand (1976–1996), Townsend and Ueda (2010) report welfare loss from financial repression. Rösl and Tödter (2015) calculated net welfare losses from financial repression based on income to depositors and cost of debtors. Overall, they find 'the cumulated net welfare losses resulting from the European Central Bank (ECB) policy of ultra-easy money already exceed the primary effects of the financial crisis.' Kähkönen (1987) on the other hand argues that financial liberalisation in the form of raising deposit rates may reduce welfare in the presence of tariffs.

Bencivenga and Smith (1991, 1992) define financial repression as the result of the policy of binding reserve requirement which constrain the liquidity in the market. The risk averseness of the individuals end in a decision to split their saving portfolios into bank deposits or physical capital assets. Their models suggest that an optimal level of repression leads to welfare improvements as the individuals continue to hold bank deposits, all investment activities are financed through the intermediary sector, and the government is able to finance its deficit via monetization (Espinosa & Hunter, 1994).

Espinosa and Yip (1996) develop a dynamic general equilibrium model of financial intermediation under an endogenous growth framework and such financial constraints. Their model indicates that under reasonable government budget deficits, a moderate level of financial repression in the form of binding reserve requirements exist. Jappelli and Pagano (1994, 1999) show that financial repression (which they define as borrowing and lending constrains) have negative welfare effect in a closed and dynamically inefficient economy with exogenous technical progress. If the economy is dynamically efficient, mild financial repression may have positive welfare effects although some generations in the overlapping generations model may receive negative welfare effects. Importantly, their model indicates that with endogenous technical progress, optimal level of financial repression is a positive function of economic growth.

3. Endogenous growth and financial repression: a simple model

Developments in the growth theory, which are referred to as endogenous growth models, have incorporated the technological development into the economic system, so that agents' behaviour has effects on the technological development and thus on growth. The growth experience of the east Asian 'tigers' has started since then to be explained by this new approach.

The model we will use to elaborate on our argument, is a simple closed-economy model, where there are four interest groups: consumers, 'robot' banks, firms/projects which are

classified under two technological categories (the traditional and the non-traditional or 'modern' technologies) and finally a government/planner whose objective is to maximise social welfare.

3.1. Consumers

There are a large number of consumers with infinite life. The representative consumer maximises an intertemporal utility function of the form:

$$u(c) = \int_0^\infty e^{-\rho t} \frac{c^{1-\theta} - 1}{1-\theta} dt \tag{1}$$

subject to

$$\dot{a} = ra + w - c \tag{2}$$

$$a(0) = a_0 > 0 \tag{3}$$

where a represents total assets owned by the consumer, w is the wage earned, ρ is the (exogenous) rate of time preference, r is the return to the assets and c is the per capita consumption of the only consumption/investment good in the economy. The constraint (2) is written with the implicit assumption that the population growth rate is zero. Each consumer is endowed with one unit of labour which he/she supplies inelastically.

There are two assets available to consumers: bank deposits and the shares. Consumers own shares in firms but they are assumed to leave the funding decisions entirely to banks and thus do not directly supply any capital. Thus, the zero *ex ante* capital gains and dividends do not enter the constraint (2), and thus assets equal bank deposits. It is assumed for simplicity that this is not a monetary economy so that the deposits are held in the form of the consumption/investment good.

The solution of (1) together with the constraint (2) implies the following optimal growth path for consumption:

$$\frac{\dot{c}}{c} = \frac{1}{\theta}(r - \rho) \tag{4}$$

Thus, in determining the optimal path for consumption, the consumer uses the return offered to the assets (deposits) by the banking system.

By construction, consumers are also owners of the banks but, since they do not pay in any capital, as in the case of firms, bank shares are not accounted for in the constraint (2).

3.2. Financial market and assets

The banking system is the link between the real economy and the consumer/saver. In our story, it is also the leverage point of the planner/government in conducting its financial policies.

For a simplifying assumption, we have that the economy is closed, and effectively the only type of asset is the indirect claim to capital stock through bank intermediation. The competitive banking system is composed of many banks managed by 'robots' programmed

to satisfy profit maximisation. In other words, the banks are assumed to incur zero factor costs in fulfilling their functions.

The funds collected by the banks are placed in firms/projects in the form of long-term credits (assuming the production process does not require any working capital). This intermediation process by the competitive banking system is assumed to be governed by a CRTS production (intermediation) function. Furthermore, the banks do not have capital of their own, as assumed before. As money is not introduced, implicitly we are assuming that no 'bank money' can be created by the banking system. In other words, through banks' aggregate balance sheet identity, total deposits equal total credits equal total capital stock at any time.[3] The simple profit function of the banking system in aggregate thus looks like:

$$\Pi = r_l D - r_b D \tag{5}$$

where D is the total funds (in terms of real consumption/investment good), r_l and r_b are the lending and borrowing rates respectively. With zero profit condition following from CRTS assumption, it follows that:

$$r_l = r_b \tag{6}$$

Thus, the competitive banking system simply determines the borrowing rate (deposit rate) by equating it to the rate they charge on credits. At that point banks maximise their profits (which is zero). However, as such (6) can be satisfied by any lending rate, as all that (6) says in this context is that the banking system reflects the return it obtains from the real economy to the deposit holders.

3.3. Firms/projects

For simplicity, the firms can be considered as capital investment projects proposed to the banking system. In the funding decision, the criterion that the banks use is the marginal product of capital offered by the projects. Projects are fully transparent and any adverse selection issue is assumed away. Projects belong to two different technological categories. We assume that labour is immobile between the two sectors.

The first project category refers to the 'traditional' technology which has an ordinary CRTS production function, with capital and labour inputs. For simplicity, we use a standard Cobb-Douglas production function.

$$Y_{ij} = F(K_{ij}, L_{ij}) = A_j K_{ij}^{\alpha} L_{ij}^{1-\alpha}, \qquad j = 1 \tag{7}$$

where F_{ij} is the production function for project i in the project category $j = 1$ (the traditional technology) with $0 < \alpha < 1$. We assume zero depreciation and no technological progress (i.e., A_j = constant). Also, a non-zero but small initial capital accumulation in the first technology is assumed:

$$k(0) = d(0) = k_0 \tag{8}$$

The marginal product of capital in the traditional sector is a function of the capital labour ratio:

$$\frac{\partial Y}{\partial K_j} = A_j \alpha k_j^{\alpha-1}, \qquad j = 1 \tag{9}$$

where k_1 is the capital labour ratio of the – identical – traditional technology firms. Marginal product of capital is a decreasing function of the capital labour ratio and convex to the origin when plotted against the capital labour ratio.

The wage rate can also be derived from the profit maximisation problem of the firms:

$$w = A_j(1-\alpha)k_j^{\alpha}, \quad j = 1 \tag{10}$$

where k_1 is the capital labour ratio in the traditional sector.

The second project category, the 'modern' or the 'non-traditional' technology, involves an increasing returns to scale (IRTS) production function (see Romer, 1986). In this technology, the aggregate capital stock of firms that possess this technology at any time is a measure of the knowledge accumulated up to that time as a by-product of the production/investment process and is assumed to have a positive externality on each of the firms in this category. Following the lines of Romer (1986) and of Barro and Sala-i-Martin (1995) this idea can be expressed with the following production function:

$$Y_{ij} = G(K_i, KL_i) = A_j K_{ij}^{\beta}(K_j.L_{ij})^{1-\beta}, \quad j = 2 \tag{11}$$

where $0 < \beta < 1$., i.e., G is CRTS in K_{ij} and K_j, where subscript i again represents ith firm. Here, K_j represents the aggregate capital stock of the firms operating in the non-traditional technology:

$$K_j = \sum_i K_{ij}, \quad j = 2 \tag{12}$$

Thus in the non-traditional sector, firms learn from their and other firms' (of the same technology) experience and this is reflected as a productivity increase for each firm.

Usual assumptions of diminishing products to each factor is retained at the firm level:

$$\partial^2 Y_{ij}/\partial K_{ij}^2 < 0 \text{ and } \partial^2 Y_{ij}/\partial L_{ij}^2 < 0, \quad j = 2 \tag{13}$$

The properties of the marginal product of capital in the non-traditional sector is more interesting. Unlike the CRTS case, the production function in the non-traditional sector brings about a wedge between the private and social marginal products of capital. By differentiating (11), the private marginal product of capital can be obtained:

$$\partial Y_{ij}/\partial K_{ij} = A_j \beta L_j^{1-\beta}, \quad j = 2 \tag{14}$$

In this differentiation, it is assumed that $K_j/\partial K_{ij} = 0$, i.e., the individual firms neglect their contribution to the aggregate capital stock and the aggregate knowledge. Note that this marginal product is a function of labour only, and thus is invariant with respect to capital labour ratio.

For the social marginal product of capital in the non-traditional sector, we first aggregate the individual production functions to get:

$$Y_j = \sum_i Y_{ij} = A_j K_j L_j^{1-\beta}, \quad j = 2 \tag{15}$$

where $L_j = \sum L_{ij}$ is the total labour in the non-traditional sector.

The social marginal product of capital is then:

$$\partial Y/\partial K_j = A_j L_j^{1-\beta}, \quad j = 2 \tag{16}$$

This is greater than the private marginal product of capital, (14), by a factor of $1/\beta$, the reciprocal of the share of capital in total production. Note, again, that the social marginal product of capital is also invariant with respect to the capital labour ratio.

Thus, to a firm in the non-traditional sector, the marginal product of capital it employs (private marginal product of capital) is less than the social marginal product of capital, which it does not care about anyway. This, of course, stems from the positive externality introduced in the production function of the non-traditional sector. Investment made by any non-traditional firm increases the productivity of all the other existing non-traditional firms and thus at the social level returns to capital exceeds the private returns contrary to the case of the traditional sector.

The wage rate in the non-traditional sector is given by:

$$w = A_j(1-\beta)k_j L_j^{1-\beta}, \quad j = 2 \tag{17}$$

The wage rate in the non-traditional sector (17) need not be equal to that of the traditional sector (10). The assumption of labour immobility between the two sectors thus leads to differentiated wages.

3.4. Government

The government/planner tries to maximise the social welfare function which can be taken as the sum of the identical individual utility functions. In this maximisation, it internalises the production/investment externality in the second technology. For the results that we want to obtain, we do not need to assume that any of the parties has private information. Thus, the production schedules and the banks' behaviour are common knowledge to both the government and the consumers. As a straightforward positive externality, the accumulation of knowledge within individual firms in the modern sector and its spill-over to other firms in the same sector is taken into consideration in the optimisation problem of the planner but not in the problem of the consumers. The government thus takes necessary actions to improve social welfare. We will use a simple apparatus to show the welfare loss in the absence of government policy, where we do not need to specify the social welfare function to be maximised by the government.

3.5. Equilibrium

In the equilibrium, the return that the banking sector can get in return to its funding depends on the sector it chooses to finance or on the distribution of its funds among the sectors. Banks, in turn, reflect this return to the deposit holders identically.

We have assumed that the banks base their funding decisions continuously on the marginal product of capital of the proposed projects. Of course, the marginal product that matters to both the banks and the firms in this respect is the private marginal product of

capital. In this respect, there is no difference between the banks and the firms themselves in the inability to internalise the positive externality.

From the aggregate balance sheet of the banks and closed economy assumption, we have total deposits equal total capital stock. Consequently, the constraint of the consumers' optimisation problem (2) can be rewritten as:

$$\dot{k} = rk + w - c \tag{18}$$

If only the traditional (CRTS) technology was available, (4), (9), (10) and (18) would yield the steady state values of capital labour ratio, consumption per person and rate of return as:

$$k^* = (\rho / A_1 \alpha)^{1/\alpha - 1} \tag{19}$$

$$c^* = A_1 (\rho / A_1 \alpha)^{\alpha/\alpha - 1} \tag{20}$$

$$r^* = \rho \tag{21}$$

Thus, for our simple case of zero depreciation, zero population growth and zero technological progress, these three variables would tend in the long-run to the constant values in (19)–(21). Given constant labour force, (19) implies a certain steady state level of aggregate capital stock, which yields a return equal to the constant (exogenous) time preference rate.

Let us introduce the new technology into the scene with the assumption that the (constant) private return to capital of the modern technology is bigger than the rate of time preference, i.e.:

$$\frac{\partial Y_{ij}}{\partial K_{ij}} = A_j \beta L_{ij} > \rho, \quad j = 2 \tag{22}$$

How will the bank funds be distributed? A graphical apparatus will facilitate the analysis. Figure 1 plots three relevant marginal product curves against the capital labour ratio of the traditional technology sector. The marginal product curve labelled CRTS is drawn for the standard neoclassical production function that the traditional sector has. By standard neoclassical assumptions, it is convex to the origin and asymptotic to both axes. With the IRTS technology in the non-traditional sector the private and social marginal products (r_1 and r_2 respectively) given by (14) and (16) are invariant with respect to the capital-labour ratio in both sectors. They are thus represented by horizontal lines on the same graph.

Banks would start funding the traditional sector first, given that $k_0 < k_1$. The capital–labour ratio and thus also bank credit–labour ratio in the traditional sector will trace the marginal product schedule (Figure 1) tending to k^*. If the government does not intervene at all, the bank funding would shift to the modern sector when k_2. is reached in the traditional sector, since at that point additional investment in the traditional sector leads to lower return compared to the modern sector.

At k_2, when the non-traditional sector starts to be funded, the marginal product of capital, instead of staying at the level r_2, actually jumps to the level r_1, the social marginal product of capital in the modern technology. The existence of the non-traditional sector thus not only provides a lower bound for the (private) marginal product of capital in the economy (which,

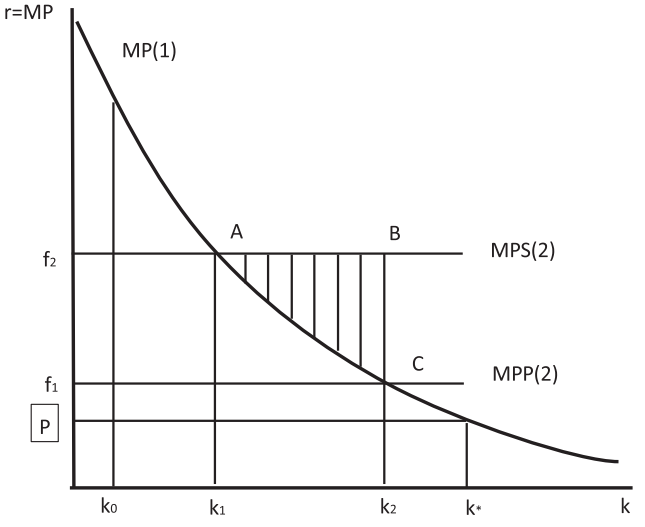

Figure 1. Schedule of marginal product of capital in the traditional sector. Source: Author.

assumed greater than ρ, allows for a constant steady state growth rate of consumption), but also provides an *ex post* mark-up over the private marginal product of capital.

Once funding of the modern technology commences, the non-traditional firms start to receive 'unexpected' (or *ex post*) returns due to productivity increases stemming from aggregate accumulation of capital and knowledge. These extra returns accrue to the owners of the new technology firms,[4] of course, and not to the banks as credit agreements between banks and firms are made on the basis of private marginal product of capital. The *ex post* constraints of consumers are thus wider than (2), which implies a higher *ex post* welfare than *ex ante*.

However, the same fact also indicates that for optimality, funds have to be shifted to the non-traditional technology, when k_1 is reached. If this action were taken, the marginal product of capital- and thus return to saving- would stay at the level of r_1, from k_1 on. In other words, from k_1 to k_2, the marginal product of capital in the economy would trace AB instead of AC.

The decentralised solution does not take the externality in the non-traditional sector and thus leads to a welfare loss, which is proxied by the shaded area in Figure 1.

3.6. Government action

In such a setting, clearly, there is room for Pareto improvement associated with government action. The usual recipe is the design of a simultaneous lump-sum tax-subsidy pair. An appropriate design will guarantee Pareto optimality.

However, the government can also intervene (when k_1 is reached) and ask banks to shift the funds to the modern sector which is feasible as the private return to capital in the modern sector is, by assumption, greater than the time preference rate.

This welfare improving action is actually a financial repression policy by the broader definition cited in the introduction because it actually distorts the financial market and lowers, exogenously, the returns; from the consumers', firms' and banks' point of view, a

ceiling (private marginal product of capital in the modern sector) is put on the returns obtainable over the assets after the point k_1, which reduces the return available to consumers had the financial market been left free. The ceiling is binding till k_2 at which point, it becomes voluntary.

Hence, government institutes a 'financial repression policy' under the umbrella of an industrial policy which has welfare improving consequences.

4. Conclusion

Rather than providing an unconditional normative statement advising repressionist policies, this article offers a theoretical example in which repressionary financial policies may be welfare improving. The current orthodoxy argues that financial repression owes its existence mainly to the government's desire to obtain 'rents' from the financial markets. In this study it is shown that, in the context of a closed economy, financial repression policies may have welfare improvement consequences if there are increasing returns to scale technologies available. This follows from the positive production and externalities embedded in such technologies that are internalised by public policies.

As the government's response to this environment boils down to an 'industry-picking' strategy, i.e., an industrial policy, another interpretation of the same result follows. This second interpretation is that in such situations where positive externalities exist, financial policies may have to be designed according to the priorities of the industrial policy. As such the model explains the financial policy conducted in East Asian countries like Korea and Japan.[5]

For various reasons, a tax-subsidy system may not be feasible with the existence of externalities such as here. Lump-sum taxes are politically not very feasible in democracies, as demonstrated by the troubles with poll tax in the UK in 1990s. Any other tax will bring about dead-weight losses. Thus, future research can compare the social costs of alternative tax-subsidy systems to financial repression policies.

Another line of future research might investigate the consequences for an open economy. Intuitively, in an open economy setting, conclusions should get further reinforced as the 'new trade theory' increasingly emphasises the importance of increasing returns to scale in international trade.[6]

Notes

1. Still, it is difficult to say that there is a consensus even in the broader definition. For example, McKinnon does not agree that in post-WWII Japan, especially in the high growth period, financial markets were repressed, whereas ceilings and government intervention existed in Japanese financial markets of the time. Yulek (1997) presents evidence against McKinnon's arguments.
2. Similar ideas have also been expressed by Amsden (1989).
3. We need to emphasise that this equation holds *ex ante*, as there exists an increasing returns to scale (IRTS) production function in the real side of the economy with the credit agreements between the banks and the firms be made on private marginal products of capital.
4. As we are not dealing with distributional issues here, we simply assume that ownerships of traditional and modern technologies are distributed evenly among consumers.
5. See Okimoto (1989) and Nester (1991) pp. 32–34 on Japan, in addition to Amsden (1989) and Amsden and Euh (1993) on Korea.
6. See for example Young (1991) and Krugman (1979).

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