

# On the Growth Effects of Endogenous Financial Development

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## Abstract

We study a simple model of financial and economic development based on consumption of real resources by the financial sector and constant returns to scale in accumulation of physical capital in the production sector. Transition from financial autarky to financial intermediation is associated with a process of reallocation of resources toward more productive investments and financial services. We find that the immediate effect of such transition process on economic development is ambiguous: financial development might slow down the growth process or even lead to a period of output decline. Redistribution policies which do not alter the timing of the transition imposed by the market forces could be insufficient to offset the possible negative-growth effects associated with the transition process, and to prevent "poverty traps" possibly originated from the premature emergence of financial intermediation.

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## 1. Introduction

The main message of the recent literature on financial and economic development is that by facilitating risk management, improving information acquisition and mobilising savings, financial institutions promote economic development.<sup>1</sup> This conclusion is supported by various cross section and panel data econometric studies like for instance King and Levine (1993a,b,c), Beck, Levine and Loayza (2000), Rayan and Zingales (1998). According to Levine (1997) while these studies do not unambiguously resolve the issue of causality they strongly support the view that the “[...] finance-growth link is a first order relationship and that difference in financial development can alter economic growth rates over ample time horizon [...]”; (Levine, 1997, p. 709).<sup>2</sup> Evidence from time series studies is, however, more mixed. For instance, Demetriades and Hussein (1996) cointegration analysis provides “[...] little support to the view that finance is a leading sector in the process of economic development [...]”; (Demetriades and Hussein, 1996, p. 385).<sup>3</sup> Xu (2000) finds that the fourteen low and lower middle income countries in his sample of 41 countries display negative long-term cumulative effects of permanent financial development on the growth of GDP and domestic investment, which suggests that both the sign and the magnitude of the relationship between finance and growth might vary depending on the level of economic development. In the same vein Harris (1997) shows that for the less developed countries the

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<sup>1</sup>Levine (1991) and Bencivenga and Smith (1991) show how financial institutions stimulate investment in high-return illiquid assets by reducing liquidity risks. Other studies like Saint Paul (1992), Deveraux and Smith (1994), Obstfeld (1994), King and Levine (1993), Acemoglu and Zilibotti (1997) show that financial institutions facilitate diversification of project-risk as well as firm-risk or country-risk thereby promoting allocation of resources toward high return/ high risk projects. Finally, Blackburn and Hung (1998), Greenwood and Jovanovic (1990), and Khan (2001) are examples of models which emphasise the role of financial institutions in acquiring information about valuable projects thereby facilitating the flow of resources toward the highest value uses.

<sup>2</sup>Cross-section and panel data studies are often characterised by huge structural heterogeneity which reduces the meaningfulness of causality analyses within these approaches. For instance Ram (1999) finds that for a sample of 95 countries (period 1960-85) multiple regression estimates when the parametric structure is allowed to vary across three subgroups suggest for low-growth and medium-growth countries there is no evidence of a growth conducive role being played by financial development, even though full sample estimate suggest a positive relationship between finance and growth.

<sup>3</sup>Demetriades and Hussein (1996) find that 6 countries out of 16 in their sample of developing countries display reverse causality, which as they argue “[...] clearly refutes the hypothesis that finance is a leading sector in these countries [...]”; (ibid. p. 406).

stock market has virtually no effect on economic growth.

Hence, if on the one hand empirical evidence leaves us with little doubt that a better functioning financial system promotes growth, on the other hand it also suggests that endogenous financial development does not always boost the growth process, and might be even be negatively correlated with the growth rate.<sup>4</sup>

Financial development allows a transformation of the production process to the extent that resources can be (re)allocated toward more productive technologies. However, whenever financial markets are not frictionless, financial transactions absorb resources. What we argue in this paper is that, once resources consumption by the financial sector has been taken into account, there is no guarantee that such transformation process results immediately in a net production gain from the system as a whole. If the technology for financial transaction implies economies to scale, then the financial system might eventually become cost effective as development proceeds thereby leading to a net output gain. Yet, the crucial question to ask is whether financial institutions are necessarily cost-effective since their endogenous emergence so that they have an immediate positive impact on economic growth. In the simple OLG model of joint determination of real and financial development we propose, the answer to the above question is no.

In the model, the economy experiences two possible regimes: financial autarky, in which individuals run production directly, and financial intermediation, in which production is delegated to firms which have access to a more productive technology than individuals. Since financial transaction costs are fixed, transition from one regime to the other occurs as the economy reaches a critical level of economic development. In this respect, the model is related to previous studies in which real and financial structures are jointly determined, like for instance Saint Paul (1992), and Greenwood and Jovanovic (1990). Financial development leads to a transition process which involves the reallocation of resources toward more productive and capital intensive technologies (and financial services). Differently from other existing models of finance and growth, like for instance Levine (1991), Bencivenga and Smith (1992), King and Levine (1993), Acemoglu and Zilibotti (1997), and also Saint Paul (1992) and Greenwood and Jovanovic (1990) among the others, we find that, no matter whether the propensity to save stays unchanged, the immediate growth effect of such transition process is ambigu-

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<sup>4</sup>Indeed, there are various historical examples in which financial development did not play an active role in fostering the growth process. In Fry's view, "[...] most of the developing countries possess highly inefficient financial institutions with neither the incentive nor the expertise to improve domestic resource mobilisation and allocation [...]"; (Fry, 1995, page 454).

ous, i.e. it might be initially negative.<sup>5</sup> The economy can initially experience a *slowdown*, or even a *transformational recession*,<sup>6</sup> although financial development would eventually bring positive growth effects provided the economy finds itself on a self-sustainable growth path after transition has occurred. This result stems from the fact that, depending on the amount of resources "wasted" in the course of intermediation, relatively to the level of intermediated resources, financial deepening might entail a net output loss and still provide a higher net return to savings compared to financial autarky. Under these circumstances, market forces determine the emergence of a financial sector which, at least in the early stages, has a negative growth impact. In our view, this result helps reconciling economic theory with the mixed evidence about finance and growth to the extent that it provides a general mechanism to explain why the relationship between finance and growth might be non-monotonic.

A corollary of the model's main result is that, even in absence of typical forms of market failures which surely, in reality, have a substantial part in shaping the transition process,<sup>7</sup> redistribution policies which do not alter the timing of the transition process imposed by the "market forces" are not necessarily enough to offset the negative growth effects possibly induced, in the early stages, by financial development. By the same token, redistribution policies which do not alter the timing of the transition could be not enough to avoid poverty traps, which might originate from a premature transition toward financial intermediation.

The paper is organised as follows. Section 2 describes the structure of the model. Section 3 analyses the endogenous emergence of financial transactions and the related growth effects. Section 4 analyses the possible dynamic patterns. Section 5 deals with the welfare effects of financial development. The final section is left for conclusions.

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<sup>5</sup>In the existing literature, the only exception to the general result that financial development promotes growth is based to the ambiguous effects that financial development might have on the propensity to save due to income and substitution effects. See for instance Jappelli and Pagano (1994) and Obstfeld (1994). Our result is fundamentally different since it does not rely on the income and substitution effects at all. In fact, due to the utility specification we adopt, all the results of the paper are derived under the hypothesis that the propensity to save is a constant parameter.

<sup>6</sup>This concept of transformational recessions is comparable to the one adopted (from Kornai (1994) by Blanchard in the context of East Europe transition economies (See Blanchard (1997), and Blanchard et al (1992)).

<sup>7</sup>For a discussion of government intervention in the credit markets motivated by typical forms of market failures stemming from information asymmetries see Hellman, Murdock and Stiglitz (2000).

## 2. The model

The economy is composed of a continuum of size 1 of individuals and a continuum of size 1 of firms. The population of individuals has a standard OLG structure with individuals living for two periods. Individuals have identical preferences and derive utility from consumption over the two periods of life according to  $U = \log c_{1,t} + \delta \log c_{2,t}$ , where  $\delta$  is the intertemporal subjective discount factor. Each young individual is endowed with a unit of labour which s/he supplies inelastically to producers earning a salary  $w_t$ . The salary is partly consumed and partly saved by young agents. Savings are expressed either in the form of self-funding of physical investment related to individual production, or deposits issued by financial intermediaries.

Production is carried out either by individuals or firms. In any case, producers operate under perfect competition. The production function has this general expression:  $Y_t = \phi A_t K_t^\alpha l_t^{1-\alpha}$ , where  $Y_t$  is the output produced using  $l_t$  units of labour and  $K_t$  units of capital, given the external effect  $A_t = k_t^{1-\alpha}$ , with  $k_t = K_t/l_t$ , and the productivity parameter,  $\phi$ . We assume that firms ( $F$ ) have access to a more productive and capital intensive technology than individuals ( $I$ ), i.e.  $\phi^F > \phi^I$ , with  $\alpha^F > \alpha^I$ . We also impose  $(1 - \alpha^I)\phi^I < (1 - \alpha^F)\phi^F$  to ensure that not only the marginal return on capital but also the marginal return on labour is higher under the technology available to firms than under the individuals' technology, for any given value of the capital/labour ratio.<sup>8</sup>

### 2.1. Saving behaviour and the financial sector

The assumptions about the return to capital associated with the two technologies provide the only justification for financial transactions in the model. According to these assumptions, the equilibrium return to capital is higher under firms' production than it is under individuals' production. Therefore, individuals have an incentive to save via lending to firms rather than self-financing. However, we assume that lending entails a fixed consumption of physical resources by an amount  $E$ . The presence of a cost reduces profitability of financial transactions. Since the cost is fixed, its adverse effects on profitability are mitigated as the volume of financial transactions operated by savers increase. In other words, as the volume of financial transactions increases the intermediary becomes more

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<sup>8</sup>These assumptions are imposed to guarantee that the firms' technology strictly dominates the individuals' one for any given level of  $k_t$ .

cost-effective. This standard argument motivates the endogenous emergence of financial transaction at some stage of economic development.

With fixed financial transaction costs savers have the incentive to delegate the lending task to a single intermediary which, for simplicity, we call bank. The bank pools savings issuing deposit contracts which pay a gross interest rate  $r^d$  and lends to firms at a gross interest rate  $r^l$ . Individuals' choice between self-financing and deposits as alternative saving devices will depend on the level of  $r^d$  compared to the equilibrium rate of return on self financing, call it  $r_t^e$ . They will choose self-financing (deposits) as long as  $r^d < (\geq) r_t^e$  as discussed in the following of the paper.<sup>9</sup> Independently of the saving device used, the optimal level of savings is equal to  $sw_t$ , where  $s = \rho/(1 + \rho)$ .<sup>10</sup>

## 2.2. Production

At each time  $t$  producers undertake investments. At period  $t + 1$  they combine the resulting accumulated capital with labour and produce. Since markets are perfectly competitive both labour and capital are paid their marginal returns. Hence, in the case of individuals' production we have  $w_t = (1 - \alpha)\phi^I k_t^{\alpha^I} A_t$ , and  $r_t^e = \alpha^I \phi^I k_t^{\alpha^I - 1} A_t$ . Similarly, in the case of firms' production we have  $w_t = (1 - \alpha^F)\phi^F k_t^{\alpha^F} A_t$ , and  $r_t^l = \alpha^F \phi^F k_t^{\alpha^F - 1} A_t$ . In equilibrium  $A_t = k_t^{1 - \alpha^i}$  holds (with  $i = F, I$  depending on whether the producers are individuals ( $I$ ) or firms ( $F$ )), so that  $w_t = (1 - \alpha^i)\phi^i k_t$ , with  $i = F, I$ ,  $r_t^l = \alpha^F \phi^F$ , and  $r_t^e = \alpha^I \phi^I$  follow.

## 2.3. Equilibrium: growth under the two regimes

We assume complete depreciation of capital. Therefore, under financial autarky, given the level of aggregate savings,  $sw_t$ , the equilibrium level of production at  $t + 1$ ,  $y_{t+1}$ , is  $s\phi^I w_t$ . Since  $w_t = (1 - \alpha)y_t$  holds, the dynamic law of motion of aggregate product is  $y_{t+1} = s(1 - \alpha^I)\phi^I y_t$ . Correspondingly, the growth rate of the economy is  $s(1 - \alpha^I)\phi^I - 1$ .

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<sup>9</sup>In strict terms if  $r^d = r_t^e$ , individuals are indifferent between the two alternatives. However, according to standard principles, we conveniently assume that in this situation agents decide to save in form of deposits.

<sup>10</sup>Note that, given the logarithmic form of the utility function, the propensity to save,  $s$ , is independent of rate of return on savings. Accordingly, individuals' optimal saving decision does not depend on the saving device used. This assumption is useful to the extent that it allows us to isolate our analysis from the effects induced by financial development on agents' propensity to save.

Under financial intermediation the net aggregate flow of savings channelled toward investment is  $sw_t - E$ . Therefore, in equilibrium, time  $t + 1$  aggregate product is  $\phi^F[sw_t - E]$ . Given that  $w_t = (1 - \alpha^F)y_t$  holds, the dynamics of aggregate product is given by  $y_{t+1} = \phi^F[s(1 - \alpha^F) - E/y_t]y_t$ , and the growth rate of the economy is  $g_t = \phi^F[(1 - \alpha^F)s - E/y_t] - 1$ .

## 2.4. Equilibrium: financial autarky versus financial intermediation

The equilibrium can be either characterised by financial intermediation or financial autarky. In the first case, individuals save through deposits and production is delegated to firms. In the second case, production is carried out directly by individuals who save through self-financing. As we said, since financial transaction costs are fixed, a single bank operates in the credit market as a monopolist. Free entry is assumed. Therefore, in equilibrium, the bank makes zero profits. Henceforth, for given volume of aggregate deposits equal to  $D_t$ , the relationship  $r_t^d D_t = r_t^l (D_t - E)$  holds. In turns, given that in equilibrium,  $r_t^l = \alpha^F \phi^F$ ,  $r_t^d = \alpha^F \phi^F (1 - E/D_t)$  follows.

The maximum aggregate volume of deposits that the bank could have access to is  $D_t = sw_t$ . Therefore, considering that savers will buy deposits if and only if  $r_t^d \geq r_t^e$ , where in equilibrium  $r_t^e = \alpha^I \phi^I$  holds, the economy will operate under financial autarky as long as  $y_t < y^c \equiv E\alpha^F \phi^F / [s(1 - \alpha^I)(\alpha^F \phi^F - \alpha^I \phi^I)]$  holds. On the other hand, the economy will operate under financial intermediation for  $y_t \geq y^c$ .

## 3. Endogenous transition to financial intermediation

Assume that the level of per capita output is initially lower than the critical value  $y^c$  so that the economy operates under financial autarky. As long as the growth rate is positive, at some period  $T$ , the economy will eventually reach a level of  $y_t$ , call it  $y^T$ , such that  $y^T \geq y^c$  holds. At this stage of economic development, a bank pooling all savings could offer a rate of return on deposits higher or equal to the equilibrium rate of return on self-financing, as previously discussed. Individuals will then prefer to save through deposits: transition from financial autarky to financial intermediation occurs. Note that  $y^T$  will be surely lower than  $y_{max}^T \equiv y^c s(1 - \alpha^I) \phi^I$ .<sup>11</sup> The growth rate of the economy in the

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<sup>11</sup>The maximum level of income such that the economy operates under financial autarky can be intuitively defined as  $y^{c-} = y^c - \epsilon$ , where  $\epsilon$  is a "very small" positive number, i.e.

transition phase is  $g^T = \phi^F [(1 - \alpha^I)s - E/y_T] - 1$ .<sup>12</sup> Such a growth rate is greater than the growth rate under financial autarky if and only if  $y^T$  is greater than  $y^{cc} \equiv E\phi^F / [s(1 - \alpha^I)(\phi^F - \phi^I)]$ . Hence, as long as  $y^{cc} > y^c$  holds there exist possible values of  $y^T$  such that transition to financial intermediation entails a negative growth effect in the transition period. Moreover, whenever the maximum level of development attainable before transition,  $y_{\max}^T$ , is lower than  $y^{cc}$ , the immediate growth impact of transition is surely negative. Pairwise comparisons of  $y^{cc}$  with  $y^c$  and  $y_{\max}^T$  yield the following:

**Result 1.** *i. If  $\alpha^F > \alpha^I$  holds, the immediate growth effect of the transition from financial autarky to financial intermediation is ambiguous. ii. If  $s(1 - \alpha^I)(\phi^F - \phi^I) < \phi^F/\phi^I - \alpha^I/\alpha^F$  holds, the growth effect of the transition is unambiguously negative.*

*Proof of Result 1.* The effects of financial development are negative for  $y^T < y^{cc}$  and positive otherwise. On the other hand financial development requires  $y^T \geq y^c$ . Accordingly, transition toward financial development yields ambiguous growth effects if and only if  $y^{cc} > y^c$ , holds. Given the expressions for  $y^{cc}$  and  $y^c$  it can be easily verified that the inequality  $y^{cc} > y^c$  reduces to  $\alpha^F > \alpha^I$ , where the latter inequality corresponds to the assumption that firms adopt a more capital intensive technology. [this ends part *i*]. We know from previous discussion that  $y^T \in [y^c, y_{\max}^T \equiv y^c s(1 - \alpha^I)\phi^I]$  holds. Then, provided  $y^{cc} > y^c$  holds, two possible cases emerge: *i.*  $y^{cc} < y_{\max}^T$ ; *ii.*  $y^{cc} > y_{\max}^T$ . In case *i* the growth effects of transition can be either negative, which is the case if  $y^T \in [y^c, y^{cc})$ , or positive, which is the case if  $y^T \in (y^{cc}, y_{\max}^T)$ . In case *ii*  $y^T$  is lower than  $y^{cc}$  for any possible value of  $y^T$  so that the growth impact of the transition is unambiguously negative at least in the transition period. Using the expressions for  $y_{\max}^T$  and  $y^{cc}$  the inequality  $y^{cc} > y_{\max}^T$  (which implies  $y^T < y^{cc}$ ) reduces to  $s(1 - \alpha^I)(\phi^F - \phi^I) < \phi^F/\phi^I - \alpha^I/\alpha^F$ . We note that in order for this inequality to be satisfied the condition  $\alpha^F > \alpha^I$  must be fulfilled. ■

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a positive number infinitely close to zero ( $\epsilon \rightarrow 0^+$ ). Consequently, given the dynamic law of motion for output under financial autarky, the maximum level of output attainable before switching to financial intermediation,  $y_{\max}^T$ , is equal to  $s(1 - \alpha^I)\phi^I y^c$  which is strictly lower than  $s(1 - \alpha^I)\phi^I y^c$ .

<sup>12</sup>Note that under financial autarky wages are given by  $w_t = (1 - \alpha^I)y_t$ . Therefore the flow of savings in the transition period is equal to:  $s(1 - \alpha^I)y_T$ . This is different from what would happen when the economy is already operating under financial intermediation in which case  $w_t = (1 - \alpha^F)y_t$  holds.

**Discussion.** In the limiting case in which financial transactions were costless, our economy would always operate under financial intermediation, thereby experiencing a growth rate equal to  $\phi^F(1 - \alpha^F)s - 1$  which is greater than that under financial autarky.<sup>13</sup> However, this simple model shows that in presence of resources' absorption due to financial transactions, transition from financial autarky to financial intermediation might have detrimental growth effects even if financial transactions enhance productivity of investment. Crucial to this result is the assumption that firms use a more capital intensive technology than the one available to individuals (i.e.  $\alpha^F > \alpha^I$ ). This is actually what one should expect if the transition from individual to firms' production associated with financial development entails a process of industrialisation.<sup>14</sup> If transition has a negative growth effect the level of per capita income at time  $T + 1$  would be lower than it would have been under financial autarky, i.e.  $y_{T+1}^{FI} < y_{T+1}^{FA}$ . However, as long as  $\alpha^F > \alpha^I$  the share of product which goes to savers,  $\alpha^F y_{T+1}^{FI}$  can be still greater than that under financial autarky,  $\alpha^I y_{T+1}^{FA}$ . This explains why non growth inducing financial development might occur. Note also, that whenever  $y_{T+1}^{FI} < y_{T+1}^{FA}$ , given  $\alpha^F > \alpha^I$ ,  $y_{T+1}^{FI}(1 - \alpha^F) < y_{T+1}^{FA}(1 - \alpha^I)$  follows. The workers of generation  $T + 1$  are made worse off. However, future generations cannot possibly decide against transition, nor are they compensated whenever they experience a loss.<sup>15</sup>

## 4. Dynamics

### 4.1. The transition phase

The process of economic development crucially depends on the effects induced by the transition from financial autarky to financial intermediation. The growth rate associated with the transition period is positive (negative) for  $y^T$  greater

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<sup>13</sup>This is obvious since firms' technology dominates that available to individuals. Otherwise the economy would operate under financial autarky. We note that  $\phi^F(1 - \alpha^F)s - 1$  is indeed the equal to the growth rate that the economy would reach in presence of fixed costs associated with financial intermediation as  $y_t$  approaches infinity.

<sup>14</sup>Hansen and Prescott (1998) model the process of industrialisation as the shift from labour intensive to capital intensive technologies.

<sup>15</sup>We note that to this extent, in OLG models, the ambiguous growth effect induced by financial development is consistent with the observation that since a market for intergenerational transfers is missing the outcome of the *laissez faire* economy needs not be Pareto-efficient.

(lower) than  $y^{cr} \equiv E\phi^F/[s(1-\alpha^I)\phi^F-1]$ .<sup>16</sup> In the case of negative growth in the transition period,  $T$ , two possible cases occur depending on  $y^{T+1}$  being smaller or bigger than the minimum income-threshold such that financial transactions are convenient,  $y_{T+1}^c \equiv E\alpha^F\phi^F/[s(1-\alpha^F)(\alpha^F\phi^F-\alpha^I\phi^I)]$ .<sup>17</sup> Case 1:  $y^{T+1} < y_{T+1}^c$ , the economy reverts to financial autarky. Case 2:  $y^{T+1} \geq y_{T+1}^c$ , the economy will still operate under financial intermediation. In the former case, as long as the growth rate under financial autarky is positive, after reversion the economy will grow until a new transition toward financial intermediation occurs. The dynamics associated with case 2 will be discussed in the next subsection.

With respect to case 1, the basic questions are whether reversion to financial autarky in the transition period is actually a possible outcome of the laissez faire economy, and whether vicious cycles characterised by repeated transition (to) and reversion from financial intermediation could correspond to some poverty trap that the laissez faire economy cannot possibly escape. The answer to this question is:

**Result 2.** *i. If the condition  $\alpha^F/\alpha^I > s(1-\alpha^I)\phi^I$  is satisfied, the economy can experience immediate reversion to financial autarky at time  $T+1$ ; ii. If the condition  $1/(1-\alpha^F) + s[\phi^F - \alpha^I\phi^I/\alpha^F] > (1-\alpha^I)s^2\phi^F\phi^I$  is satisfied, transition cannot possibly be completed: the economy is in a poverty trap.*

*Proof of Result 2.* Transition cannot be completed as long as  $y^{T+1} \equiv y^T(1-\alpha^I)s\phi^F - E\phi^F < y_{T+1}^c$  holds. We know from previous discussion that  $y^T \in [y^c, y_{\max}^T]$ . A necessary condition for the economy to experience immediate reversion to financial autarky is that at least for the smallest possible value of  $y^{T+1}$ , defined as  $y_{\min}^{T+1} \equiv \phi^F[(1-\alpha^F)sy^c - E]$ , the condition  $y_{\min}^{T+1} < y_{T+1}^c$  holds, where  $y_{T+1}^c$  is the smallest possible value of per capita income such that the economy operates under financial intermediation in the post-transition period as defined at the beginning of this sub-section. Using the expression for  $y_{T+1}^c$  it is immediate to verify that the above inequality holds as long as  $\alpha^F/\alpha^I > s(1-\alpha^I)\phi^I$  is satisfied, [this ends part *i*]. Transition cannot possibly be completed as long as for the maximum level of income at time  $T+1$ , defined as  $y_{\max}^{T+1} = y_{\max}^T(1-\alpha^I)\phi^F s - E\phi^F$ , the condition  $y_{\max}^{T+1} < y_{T+1}^c$  holds. Substituting for the values of  $y_{\max}^T$  and  $y_{T+1}^c$ ,

<sup>16</sup>Recalling that the growth rate in the transition phase is  $g^T = \phi^F[(1-\alpha^I)s - E/y^T] - 1$ , it immediately follows that  $g^T > (<) 0$  whenever  $y^T > (<) y^{cr} \stackrel{def}{=} E\phi^F/[s(1-\alpha)\phi^F-1]$ .

<sup>17</sup>Note that, the critical value of income such that financial intermediation is profitable in the post transition period,  $T+1$ , which we labelled  $y_{T+1}^c$ , is greater than the correspondent value for the transition period  $y^c$ . This is due to the fact that the labour share of total product has changed (negatively) from  $1-\alpha^I$  to  $1-\alpha^F$ .

this inequality reduces to  $1/(1 - \alpha^F) + s[\phi^F - \alpha^I \phi^I / \alpha^F] > (1 - \alpha^I) s^2 \phi^I \phi^F$  [this ends part *ii*]. ■

**Discussion.** Result 2 is an intuitive corollary to Result 1. Given that the growth impact of resource-consuming financial intermediation is uncertain, the possibility of turning from positive growth under financial autarky to negative growth under financial intermediation such that the economy immediately reverts to financial autarky in the post-transition phase directly stems from continuity.

#### 4.2. The post-transition phase

As we already mentioned assuming the level of per capita income in the post transition phase (period  $T + 1$ ),  $y^{T+1}$ , is greater than  $y^c$  the economy still operates under financial intermediation and the growth rate is given by  $g_{T+1} = \phi^F [(1 - \alpha^F)s - E/y_{T+1}] - 1$ , which is negative for  $y^{T+1} < y^{crp} \equiv E\phi^F / [\phi^F(1 - \alpha^F)s - 1]$  and positive otherwise. Comparing this growth rate with that associated with the transition phase, and the critical level of income  $y^{crp}$  with the maximum level of income attainable at period  $T + 1$  yields:

**Result 3.** *i. Whenever  $s[(\alpha^F - \alpha^I)] > E[1/y^{T+1} - 1/y^T]$  the growth rate in the post transition is lower than during transition. ii. Whenever  $\alpha^F/\alpha^I > (1 - \alpha^F)s\phi^I$  the economy could experience vicious cycles; iii. Whenever the condition  $[s(1 - \alpha^I)\phi^I - 1](1 - \alpha^F) < [1 - \alpha^I/\alpha^F]\phi^I/\phi^F$  is satisfied the economy experiences a poverty trap.*

*Proof of Result 3.* The growth rates in the transition and the post-transition phases are  $g^T = s(1 - \alpha^I)\phi^F - E\phi^F/y^T$  and  $g^{T+1} = s(1 - \alpha^F)\phi^F - E\phi^F/y^{T+1}$ , respectively. It then follows immediately then whenever  $s[(\alpha^F - \alpha^I)] > E[1/y^T - 1/y^{T+1}]$  holds, the economy experiences lower growth in the post transition phase than under transition. It is worth noting that as long as  $g^T < 0$  the above condition is automatically satisfied; [this ends part *i*]. At period  $T + 1$ ,  $y^{T+1} = s(1 - \alpha^I)\phi^F y^T - E\phi^F$  holds. As already mentioned, whenever  $y^{T+1} < y^{crp} \equiv E\phi^F / [\phi^F(1 - \alpha^F)s - 1]$  holds, the economy experiences negative growth in the post-transition phase so that  $y_t$  eventually shrinks until financial autarky is restored as an equilibrium (vicious cycle). On the other hand, we know that  $y^{T+1}$  is at least equal to  $y^c(1 - \alpha^I)s\phi^F - \phi^F E$ . Then, it follows that the economy could experience ‘vicious cycles’ as long as  $y^c(1 - \alpha^I)s\phi^F - \phi^F E < y^{crp}$ . Given the expressions for  $y^c$  and  $y^{crp}$  this inequality reduces to  $\alpha^F/\alpha^I > (1 - \alpha^F)s\alpha^I$ ; [this completes part *ii*].

We recall that the maximum level of income at time  $T + 1$  is  $y_{\max}^{T+1} = y_{\max}^T \phi^F (1 - \alpha^I) s - E \phi^F$ . As long as  $y_{\max}^{T+1} < y^{cpr}$  the economy always experiences negative growth in the post-transition phase so that it eventually reverts to financial autarky (poverty trap). Given the expressions for  $y^{cpr}$  and  $y^{T,\max}$  this inequality reduces to  $[s(1 - \alpha^I)\phi^I - 1](1 - \alpha^F) < [1 - \alpha^I/\alpha^F]\phi^I/\phi^F$ . ■

**Discussion** The economic intuition behind result 3 lies in the fact that in the post-transition phase, when the capital intensive technology is already in place, the labour's share of total product is reduced compared to the transition phase. As a consequence, even in cases in which transition has positive growth effects, so that total product is increased compared to the level it would have reached under financial autarky, workers of the post-transition generation might still be worse off since their product share,  $1 - \alpha^F$ , is lower than under financial autarky. In turns, this implies that the growth rate in the post transition period could be lower than that associated with transition. This also entails the possibility of poverty traps occurring at this stage of the transition process. It is however important to recognise that as per capita income grows, the economy under financial intermediation will finally experience a higher growth rate than the economy under transition; so that the existence of a financial sector has finally positive growth effects.<sup>18</sup> This directly implies that the model presented suggests the possibility of a non-monotonic relationship between financial and economic development.

Finally, we note that the key mechanism behind all the results in the model carries over to a standard Solowian growth model. Even if conditions for long run endogenous growth are not satisfied, as long as with financial development the economy moves to a more productive but also more capital intensive technology, depending on the amount of resources lost due to financial transactions, the transition might result in a net output loss even though it guarantees a higher return to savings. Hence, the relationship between growth and financial development along the transition path toward steady state might still be non monotonic similarly to the case of the endogenous growth we present in this paper.

## 5. Can public policy prevent poverty traps?

According to results 1, 2 and 3 the *laissez faire* economy can be characterised by premature financial development such that the transition process is, at least

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<sup>18</sup>Note that as per capita income goes to infinity the growth rate under financial intermediation reduces to  $s(1 - \alpha^F)\phi^F - 1$ .

in the early stages, detrimental for growth. In extreme cases such the premature development of financial services is bound to compromise chances of long run sustainable development. Whenever the transition process has negative growth effects, this directly implies that financial development neither implies a Pareto Improvement nor it implies a Potential Pareto Improvement when welfare of future generations is taken into account. While members of generation  $T$  gain from the transition, members of generation  $T + 1$  and or members of subsequent generations will loose.<sup>19</sup> Turning to public intervention this means that redistribution policies might be not enough to offset the potentially Pareto-inefficient outcome of the laissez faire economy. An interesting question is then whether redistribution policies could at least prevent vicious cycles and poverty traps which might possibly be associated with the transition phase. The following result holds:

**Result 4.** i. Whenever  $s\phi^I(1 - \alpha^I) < \alpha^F/[(1 - \alpha^F)\alpha^I]$  any redistribution policy that does not alter the timing of the transition to financial intermediation might fail to help the economy to complete the transition phase; ii. Whenever the condition  $s(1 - \alpha^I)\phi^F\alpha^I < \alpha^F/(1 - \alpha^F)$  holds, any redistribution policy which does not alter the timing of the transition is surely insufficient to prevent poverty traps.

*Proof of result 4.*

With the transition, members of generation  $T$  gain  $G_T = s(1 - \alpha^I)y^T[\alpha^F\phi^F - \alpha^I\phi^I] - \alpha^F\phi^F E$ . If the redistribution policy is meant not to alter the timing of transition the most that could be redistributed from members of generation  $T$  to members of generation  $T + 1$  is  $G^T$ . In this case, each young member of generation  $T + 1$  would have an income equal to

$$y^{T+1,R} \equiv G_T + w_{T+1} = s(1 - \alpha^I)y^T[\phi^F - \alpha^I\phi^I] - E\phi^F.$$

The lowest possible value of  $y^T$  is  $y^c$ .<sup>20</sup> Substituting for its value into the above expression yields:

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<sup>19</sup>We recall that the negative growth effect of financial development might appear in the transition period as well as in the post transition period. In the former case members of generation  $T + 1$ , and subsequent generations as well, are made worse off. In the latter case, the first generation to experience negative consequences from the transition would be generation  $T + 2$ . Note that, under the hypothesis that the negative growth effects in the post transition period outweigh the initial positive effects, the conditions for a Potential Pareto Improvement are not met.

<sup>20</sup>We recall that  $y^c$  is the critical value of per capita income such that for  $y^T > (<)y^c$  the economy operates under financial intermediation (autarky).

$$y_{\min}^{T+1,R} \equiv \frac{E\phi^F \phi^I \alpha^I (1 - \alpha^F)}{(\alpha^F \phi^F - \alpha^I \phi^I)}.$$

Comparison with  $y_{T+1}^c$ , where we recall that  $y_{T+1}^c$  is the minimum value of per capita income such that the economy operates under financial intermediation in the post-transition period, yields:

$$y_{\min}^{T+1,R} < y_{T+1}^c \Leftrightarrow s\phi^I(1 - \alpha^I) < \alpha^F / [(1 - \alpha^F)\alpha^I].$$

As long as this condition is satisfied any redistribution policy which does not alter the incentives of generation  $T$  to introduce financial transactions (at time  $T$ ) might fail to enable the economy to complete the transition phase [This completes part *i*]. Given the expression for the maximum value of per capita income at period  $T + 1$  in presence of full redistribution of  $G_T$  to generation  $T + 1$ ,

$$y_{\max}^{T+1,R} = s(1 - \alpha^I)y_{\max}^T[\phi^F - \alpha^I\phi^I] - E\phi^F,$$

recalling the expression for  $y_{\max}^T$  and comparing  $y_{\max}^{T+1,R}$  with  $y_{T+1}^c$ , we have that

$$y_{\max}^{T+1,R} < y_{T+1}^c \Leftrightarrow s(1 - \alpha^I)\phi^F \alpha^I < \alpha^F / (1 - \alpha^F).$$

So that whenever the condition on the RHS holds redistribution policies in favour of generation  $T + 1$  which do not alter the timing of transition are not enough to escape the poverty trap associated with the transition process. We note that a result equivalent to the one presented here holds also in the post-transition phase.<sup>21</sup> ■

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<sup>21</sup>A similar result holds in the post-transition phase. Assume that the transition growth rate,  $g_T$  is negative and such that  $y_{T+1} = y_{T+1}^c$  (note that  $y_{T+1}^c < y_T^c$ ). Since by assumption  $g_T < 0$ , it then follows from result 3 that  $g_{T+1} < g_T$ . Hence, the growth rate in the post transition phase is negative so that  $y_t$  shrinks until financial autarky is restored (vicious cycle). A redistribution policy cannot prevent this outcome for the very reason that there is nothing to be redistributed. In fact, given  $y_{T+1} = y_{T+1}^c$ , the return on deposits is exactly equal to the return on self-financing, so that the  $T + 1$  young generation does not experience any gain. Assume now that for  $y_{T+1}^{\max} = y_{T+1}^c$  (note that, on the basis of result 2, the relevant condition for this situation to occur is  $1/(1 - \alpha^F) + s[\phi^F - \alpha^I\phi^I/\alpha^F] = (1 - \alpha^I)s^2\phi^I\phi^F$ ). Then, the above analysis applies which leads to the conclusion that in this latter case redistribution policies of the type described do not impede poverty traps endemically associated with laissez faire financial development.

In reality transition processes are shaped by many factors and many potential sources of market failures like moral hazard and adverse selection might characterise the emerging financial markets. Yet, the above analysis shows that, even abstracting from these important factors, spontaneous financial development might yield fail to promote economic growth no matter if supported by redistribution policies as long as they do not halter the time of the transition. Hence, even in absence of other sources of market failures, appropriate policies other than redistribution might have to be adopted. Attracting foreign savings might help but also postponing transition toward financial development by means of (partial) financial repression might play a role.

## 6. Conclusion

It is a general view in the literature that financial development guarantees a better allocation of savings thereby inducing positive long run growth effects whenever conditions for endogenous growth are satisfied. Yet, empirical evidence shows that while the existence of financial services is a precondition for economic development, in many instances, the financial institutions spontaneously generated by the market forces are not efficient enough to promote growth. We developed a theoretical model in which transformational recessions might occur as the economy moves toward more capital intensive and productive technologies while developing the financial sector which guarantees the necessary mobilisation of savings. Therefore, the model, offers a simple theoretical justification of why, independently of common sources of (financial) market(s) failure like moral hazard and adverse selection non growth inducing financial institutions might emerge at the early stages of financial and economic development. Redistribution policies which do not halter the time of the transition process might not be enough to escape poverty traps which might be induced by the transition process itself.

Finally, although the model presented is concerned with an economy which is initially in state of financial autarky, the implications of the analysis extend to the case in which a new financial technology are introduced starting from a situation in which financial intermediation is already in place. Within the model's assumptions, the immediate growth effect of such a financial innovation could still be ambiguous only to the extent that the introduction of the new financial technology is accompanied by changes in the production technology being adopted.

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