

Economic Globalization, Mercantilism and Economic Growth

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Abstract

Obstfeld (1994) shows theoretically that international economic integration accelerates economic growth of all countries in the world, which does not match the data very well. By introducing Zou (1994)'s viewpoints of mercantilism into the Obstfeld model, the paper shows that the excessive pursuits for wealth heighten the demand for financial assets with high return and high risk in the global financial market which distorts the mechanism of financial market promoting economic growth, and hence leads to different growth performances within different countries. Specifically, for different economies, not only do the same technology or preference shocks have different growth effects, but also economic integration has different growth effects.

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1 Introduction

In a stochastic model with heterogenous consumers who diversify financial portfolios globally, Obstfeld (1994) shows that financial openness enforces an attended world portfolio shift from safe low-yield capital to riskier high-yield, specialized productive capitals and hence promotes all countries' economic growth in the world. Namely, economic globalization does good to all countries in the world economy. Obstfeld (1994)'s research provides strong theoretical supports for economic globalization, trade liberalization and financial openness. However, the theoretical results of Obstfeld (1994) does not accord very well with the economic facts on economic globalization since 1960s.

Dollar and Kraay (2001) provide plenty of data on economic globalization which show that Obstfeld (1994)'s arguments may be misleading. From the aggregate data from 1960s to 1990s listed in table 3 in their paper, though the improvements of degrees of openness of globalizers (increases of imports and exports and reductions of import tariffs) accelerate their economic growth rates (the ratios of trade to GDP of globalizers: 15.7% in 1960s, up to 16.0% in 1970s, to 24.75% in 1980s, and to 32.6% in 1990s; the levels of import tariffs of globalizers: 57.4% in 1980s, down to 34.5% in 1990s; growth rates of GDP: 1.4% in 1960s, up to 2.9% in 1970s, to 3.5% in 1980s, and to 5.0% in 1990s), however, the improvements of degrees of openness of rich countries bring about the reduction of economic growth (the ratios of trade to GDP of rich countries: 20.5% in 1960s, up to 29.3% in 1970s, to 36.8% in 1980s, and to 50.0% in 1990s; the levels of trade to GDP: 14.6% in 1980s, down to 7.4%; the growth rates of GDP: 4.4% in 1960s, down to 3.6% in 1970s, to 2.6% in 1980s, and to 2.4% in 1990s). From the cross-country data of 24 post-1980 globalizers in table 1 and 2 in their paper, some countries gained more rapid growth from economic openness, such as Argentina, Bangladesh, China, Dominican, Haiti, Hungary, India, Ivory Coast, Malaysia, Mexico, Nicaragua, Paraguay, and Zimbabwe etc.; some countries grew more slowly from economic openness, such as Colombia, Costa Rica, Jamaica, and Thailand etc., and other countries kept the same paces as before, even though their degrees of openness were improved greatly. The economic data show that not all of the countries gain advantages from economic globalization because some economies keep their growth constant and some countries get worse from economic openness. The divergence between the theoretical model and real

economic data reveals the failure of the Obstfeld (1994) model in explaining the real effects of economic globalization. Meanwhile, it is also necessary to develop appropriate models to explain the real economic data.

How to explain these data? Actually, when referring to terminologies of imports and exports, import tariffs and trade liberalization, we are likely to remind of mercantilism which attaches importance to trade protections and favorable balances of trade opposite to liberalism. As an important genre in the history of economic thought, mercantilism dominated the mainstream of the world economy in at least one half of 500 years after its emergence in the sixteen century. The conclusion can be drawn from the development history of mercantilism. Mercantilism experiences three rapid developmental stages roughly from its emergence to the present: the first stage is from the sixteenth century to the end of the eighteenth century. In these 300 years or so, mercantism experiences the most rapid development. In this period, mercantilism deminated the western europe and led to the earliest developed countries in the history such as Spain, Portugal, Germany, Poland, Russia, Sweden, France, Netherlands and Britain etc.. Namely, the modern europe did not grow up until the emergence and development of mercantilism.¹The second one is from the end of the nineteenth century to the second world war, in which neomercantilism came into being and grew. The prominent events of neomercantilism are that US and Germany surpassed UK who had begun to advocate free trade since the end of the eighteenth century successively and became the first and second economic powers at that time. Besides, by utilizing mercantilist policies Japan became the sole developed country outside the europe in the same period. The third one is from 1970s to the present, in which the outstanding events are the rapid growth of emerging market economies. Furthermore, ever since the breakout of 2009 financial crises, in order to save the severe situation of native employment and weak economies, the developed countries headed by US adopted a large number of protective policies, contrary to the export-oriented policies utilized by emerging market economies (EMEs) in the long run. It seems like that mercantilism begins to renew its influence in the global economy. Altogether, mercantilism dominated the world economy in the most of 500 years from its emergence. Because of this observation, we conjecture that it will be helpful to explain the real data of economic globalization by introducing mercantilism.

¹A detailed recount of the first stage of mercantilism is in Cameron (1993).

Then, how to introduce mercantilism? We review the literature on mercantilism at first. It will be appropriate to divide the theoretical literature into two parts roughly. Before 1960s, almost all great economists ever worked on mercantilism, such as Adam Smith, John Maynard Keynes, Joseph Schumpeter, Jacob Viner and Eli Heckscher etc.. Their researches focused on describing phenomena, theoretical analysis and citing literature. However, no theoretical models were developed. From 1960s to the present, some mathematical models on mercantilism have been constructed. In the framework of Keynesian economics, Samuelson (1964) put forward the first mathematical model of mercantilism. He argued that “with employment less than full and net national product suboptimal, all the debunked mercantilistic arguments turn out to be valid. Tariff can then reduce unemployment, can add to the NNP, and increase the total of real wages earned”. Based on strategic trade theory, Irwin (1991) points out that the reason why Dutch gained the strategic advantages over Britain in the east india trade is that Dutch harnessed political power and privileges to commercial purposes and hence made him the Stackelberg leader. Irwin (1991) argues that export subsidies do good to the native economy. From the viewpoint of mercantilism as a fiscalism, McDermott (1999) points out that the development of mercantilism is harmful for the long-run economic growth. In order to attain more fiscal revenues, government will adopt the mercantilist policy of controlling the degree of openness which will damage human capital accumulation, and hence long-run growth and convergence to the developed economies. In a framework of modern theory of international finance, Zou (1997) models the central theme of mercantilism, i.e., power and plenty, and points that an increase of the spirit of mercantilism or import tariffs will increase the long-run capital accumulation and aggregate level of consumption. Aizenman and Lee (2007) identify the contributions of precautionary and mercantilist motives to the hoarding of international reserves in developing countries. The empirical part of their paper shows that the precautionary motive accounts for the major part of the high levels of reserves and the mercantilist motive just accounts for the minor part; the theoretical part provides a particular mechanism for the empirical result: the large precautionary demand for international reserves is a kind of self-insurance for “sudden stops”. And Durdu et al. (2009) draw the similar result to Aizenman and Lee (2007) in a framework of stochastic dynamic general equilibrium. In the paper, we adopt Zou (1997)’s modelling strategy of mercantilism to explain the real economic data on globalization.

By introducing Zou (1997)’s viewpoints on mercantilism into the Obst-

feld (1994) model, the paper shows that the excessive pursuits for wealth heighten the demand for the financial assets with high return and high risk in the global financial market which distorts the mechanism of the financial market promoting economic growth, and hence leads to different growth performances within different countries. Specifically, for different economies, not only do the same technology or preference shocks have different growth effects, but also economic integration has different growth effects. The paper not only explains the real economic facts and promotes us to reexamine the economic aftermaths of the blind globalization, but also provides a new framework for explaining the diversity of the global economic growth².

The second section of this paper gives the individual choice in a closed economy. In section 3, we discuss the equilibrium of the closed economy and the results of comparative statics. In section 4, we examine the economic effects of international economic integration and the diversity of economic growth. In section 5, we summarize the main findings and give some policy suggestions.

2 Individual Choice in a Closed Economy

In the beginning, we consider a closed economy with uncertainty. There exists a single good. The closed economy is populated by identical infinitely-lived individuals who face consumption and savings decisions. At each moment t , the objective function $U(t)$ of the representative individual is given by the recursion implicitly

$$f[(1-R)U(t)] = \left(\frac{1-R}{1-\frac{1}{\varepsilon}}\right) [C(t)W(t)^\theta]^{1-\frac{1}{\varepsilon}} h + e^{-\delta h} f[(1-R)E_t U(t+h)], \quad (1)$$

where $f(x)$ is defined by

$$f(x) = \left(\frac{1-R}{1-\frac{1}{\varepsilon}}\right) x^{\frac{1-\frac{1}{\varepsilon}}{1-R}}. \quad (2)$$

In equation (1), E_t is a mathematical expectation operator conditional on time- t information, $C(t)$ is time- t consumption, $W(t)$ is time- t wealth. Sim-

²The famous literature of explaining the diversities of economic growth includes Romer (1986, 1990), Lucas (1988), and Grossman and Helpman (1991), Razin, Sadka and Yuen (2000), Jalles (2009), and Chen (2012) etc..

ilar to Zou (1997), the utility from consumption can be understood as a measure of opulence and plenty in the words of Viner (1948), and the utility from wealth as the power a nation possesses and enjoys. θ (> 0) stands for the development degree of mercantilism, and the larger θ corresponds to the higher degree. From equations (1) and (2), we can derive the utility function $U(t)$ as follows

$$U(t) = \left\{ \left[\frac{(C(t)W(t)^\theta)^{1-R}}{1-R} \right]^{\frac{1-\frac{1}{\varepsilon}}{1-R}} h + e^{-\delta h} [E_t U(t+h)]^{\frac{1-\frac{1}{\varepsilon}}{1-R}} \right\}^{\frac{1-R}{1-\frac{1}{\varepsilon}}}, \quad (3)$$

where the parameters R (> 0) and ε (> 0) measures the household's relative risk aversion (RRA) and its elasticity of intertemporal substitution (EIS). If $R = \frac{1}{\varepsilon}$ holds, $f(x) = x$, and (3) degenerates as the standard time- and state-separable expected-utility setup.³

Different from Eaton (1981) and Obstfeld (1994), for simplicity, we assume that there exist two kinds of assets: a risk-free asset with an exogenously given positive rate of return i and a risky asset with an instantaneous expected rate of return $\alpha > i$ and standard deviation $\sigma > 0$. It is assumed that the individuals make investment decision using both of these two assets and consumption and assets can be transformed into each other one-to-one with zero cost. Moreover, it is assumed that there is no nondiversifiable income (such as labor income) which means that assets markets in this closed economy are complete. Let $V^B(t)$ denote the cumulative time- t value of a unit of output invested in riskless assets at time 0 and $V^K(t)$ the cumulative time- t value of a unit of output invested in risky assets at time 0. Explicitly, $V^B(0) = V^K(0) = 0$. With payouts re-invested and continuously compounded, $V^B(t)$ obeys the ordinary differential equation

³The more general preference setup of the non-expected utility function was proposed by Epstein and Zin (1989, 1991) and Weil (1989, 1990). It is problematic for the usual expected utility function in which the coefficient of relative risk aversion is the reciprocal of the elasticity of intertemporal substitution, since the elasticity of substitution revealing the relationships between interest rate and consumption growth is a dynamic concept with respect to time, whereas the coefficient of relative risk aversion reflecting the risk attitude of people is a static concept. Essentially, they have nothing to do with each other. The two advantages for considering such preferences are examining dynamic welfare comparisons correctly and finding how preference parameters influence the long-run economic growth.

$$dV^B(t) = iV^B(t)dt, \quad (4)$$

and $V^K(t)$ obeys the geometric diffusion process

$$\frac{dV^K(t)}{V^K(t)} = \alpha dt + \sigma dz(t). \quad (5)$$

Thereinto, $dz(t)$ is a standard Wiener process, such that $z(t) = z(0) + \int_{s=0}^t dz(s)$, and σ^2 is the instantaneous variance of returns. Actually, we can look down upon (4) and (5) as two exogenously given “production” technologies: (4) is a risk-free production technology and (5) a risky production technology.

Per capita wealth $W(t)$ is the sum of per capita holdings of the composite safe asset, $B(t)$, and per capita holdings of risky asset, $K(t)$:

$$W(t) = B(t) + K(t). \quad (6)$$

Equations (4), (5), and (6) imply that

$$dW(t) = iB(t)dt + \alpha K(t)dt + \sigma K(t)dz(t) - C(t)dt. \quad (7)$$

Let $\omega(t)$ denote the fraction of wealth invested in risky capital, and $1-\omega(t)$ the fraction of wealth in risk-free assets. Then, an alternative way to write (7) is as

$$dW(t) = \{\omega(t)\alpha + [1 - \omega(t)]i\} W(t)dt + \omega(t)\sigma W(t)dz(t) - C(t)dt. \quad (8)$$

The individual’s optimization problem can be formulized as follows: maximize (3) and subject to wealth accumulation equation (8) and the initial condition $W(t) = W_t$. It is easy to know that the utility function given by (3) is ordinally equivalent to the following continuous form

$$U(t) = E_t \int_{s=t}^{\infty} f(C_s, W_s, U_s) ds, \quad (9)$$

where ²

$$f(C_s, W_s, U_s) = \frac{(CW^\theta)^{1-\frac{1}{\varepsilon}} - \delta [(1-r)U_s]^{\frac{\varepsilon-1}{\varepsilon(1-R)}}}{(1-\frac{1}{\varepsilon}) [(1-R)U_s]^{\frac{\varepsilon-1}{\varepsilon(1-R)}-1}}.$$

Let $J(W_t)$ denote the maximum feasible level of lifetime utility when wealth at time t equals W_t . Itô's lemma shows that the corresponding Hamiltonian-Jacob-Bellman (HJB) equation is

$$0 = \max_{\{C, \omega\}} \left\{ \frac{(CW^\theta)^{1-\frac{1}{\varepsilon}} - \delta [(1-r)U_s]^{\frac{\varepsilon-1}{\varepsilon(1-R)}}}{(1-\frac{1}{\varepsilon}) [(1-R)U_s]^{\frac{\varepsilon-1}{\varepsilon(1-R)}-1}} + J'(W) [\omega(\alpha-i)W + iW - C] + \frac{1}{2} J''(W) \omega^2 \sigma^2 W^2 \right\}.$$

The first-order conditions with respect to C and ω follow:

$$C = J'(W)^{-\varepsilon} [(1-R)J]^{\frac{1-\varepsilon R}{1-R}} W^{\theta(\varepsilon-1)}, \quad (10)$$

$$\omega = -\frac{J'(W)}{J''(W)W} \frac{\alpha-i}{\sigma^2}. \quad (11)$$

Substituting equations (10) and (11) into HJB equation gives rise to

$$0 = \frac{\varepsilon}{\varepsilon-1} J^{1-\varepsilon} [(1-R)J]^{\frac{1-\varepsilon R}{1-R}} \theta^{\theta(\varepsilon-1)} - \frac{\varepsilon\delta}{\varepsilon-1} (1-R)J + \quad (12)$$

$$J' \left\{ -\frac{J'(\alpha-i)^2}{J''\sigma^2} + iW - J'^{-\varepsilon} [(1-R)J]^{\frac{1-\varepsilon R}{1-R}} W^{\theta(\varepsilon-1)} \right\} + \frac{1}{2} \frac{J'^2(\alpha-i)^2}{J''\sigma^2}.$$

The objective function suggests a guess that maximized lifetime utility U is given by

$$J(W) = AW^{(1+\theta)(1-R)}. \quad (13)$$

Then, $J' = A(1+\theta)(1-R)W^{(1+\theta)(1-R)-1}$, $J'' = A(1+\theta)(1-R)[(1+\theta)(1-R) - 1]W^{(1+\theta)(1-R)-2}$. Substituting (13) into (12) leads to

$$[A(1-R)]^{\frac{1-\varepsilon}{1-R}} (1+\theta)^{1-\varepsilon} = \varepsilon\delta - (\varepsilon-1)(1+\theta) \left[i - \frac{1}{[(1+\theta)(1-R) - 1]} \frac{(\alpha-i)^2}{2\sigma^2} \right] \equiv \mu. \quad (14)$$

Similar to Merton (1971) and Obstfeld (1994), in order to guarantee the existence of optimality, we assume that

$$\mu > 0. \quad (15)$$

Equation (15) tells that the parameters ought to satisfy the following two conditions:

$$[A(1 - R)]^{\frac{1-\varepsilon}{1-R}} > 0, \quad (16)$$

$$\varepsilon\delta - (\varepsilon - 1)(1 + \theta) \left[i - \frac{1}{[(1 + \theta)(1 - R) - 1]} \frac{(\alpha - i)^2}{2\sigma^2} \right] > 0. \quad (17)$$

Substituting (13) into (10) gives

$$C = [A(1 - R)]^{\frac{1-\varepsilon}{1-R}} (1 + \theta)^{1-\varepsilon} W \equiv \mu W. \quad (18)$$

(18) and (15) show that the optimal consumption-wealth ratio is a positive constant μ . If mercantilism is not introduced, it returns to Obstfeld (1994): $\mu = \varepsilon \left\{ \delta - 2 \left(1 - \frac{1}{\varepsilon}\right) \left[i + \frac{(\alpha - i)^2}{2\sigma^2} \right] \right\}$; if $R = \frac{1}{\varepsilon}$ holds, it returns to Merton (1971): $\mu = \frac{1}{R} \left\{ \delta - (1 - R) \left[i + \frac{(\alpha - i)^2}{2\sigma^2} \right] \right\}$. Substituting equation (13) into (11) results in

$$\omega = \frac{1}{[1 - (1 + \theta)(1 - R)]} \frac{\alpha - i}{\sigma^2}. \quad (19)$$

From (19), on one hand, similar to Merton (1969, 1971) and Obstfeld (1994), the portfolio weight depends not on the elasticity of intertemporal substitution but on risk attitudes and production technologies; on the other hand, different from them, the portfolio weight also depends on the development degree of mercantilism. Obviously, if no mercantilism, i.e., $\theta = 0$, then we get back to the formula derived by Merton (1969, 1971) and Obstfeld (1994): $\omega = \frac{\alpha - i}{R\sigma^2}$.

3 Closed-Economy Equilibrium and Comparative Statics

3.1 Closed-Economy Equilibrium

Equilibrium growth in this closed economy can now be described. There exists several possibilities about the equilibrium portfolio choice. First of all, a possibility is that $\omega > 1$, which means that the closed economy wishes

to go short in risk-free assets in the aggregate. When the initial supply of risk-free assets is excessive, this type of equilibrium may occur. And in such equilibrium, from (19), we know that $R > \frac{\theta}{1+\theta}$, and $\alpha > i + \sigma^2[1 - (1 + \theta)(1 - R)]$. The possible reason for occurrence of this equilibrium is that the yields of the risk-free assets are too low in the beginning of the economy. And in this equilibrium, the return of risk-free assets will rise, until $\alpha = i + \sigma^2[1 - (1 + \theta)(1 - R)]$, i.e., $\omega = 1$. Secondly, $\omega < 0$ is possible. From (19), $R < \frac{\theta}{1+\theta}$. In this case, the coefficient of the relative risk aversion is small and people want to sell short risky assets. The reason for this possibility is that the risk of risky assets approaches infinite. Finally, $\omega \in (0, 1)$. In this equilibrium, people possess both risky and risk-free assets. In the following, it is assumed that the former two cases do not occur.

Equations (8) and (18) tell that

$$dW = [\omega\alpha + (1 - \omega)i - \mu] W dt + \omega\sigma W dz. \quad (20)$$

Equations (18) and (20) result in

$$dC = [\omega\alpha + (1 - \omega)i - \mu] C dt + \omega\sigma C dz. \quad (21)$$

Define g as the instantaneous expected growth rate of consumption, $g \equiv \frac{E_t[dC(t)/dt]}{C(t)}$. Equation (21) shows that g is endogenously determined as the average expected return on wealth, $\omega\alpha + (1 - \omega)i$, less the ratio of consumption to wealth, μ . Combination of (14) and (19) leads to a closed-form expression for the expected consumption growth rate,

$$g = [1 + (\varepsilon - 1)(1 + \theta)] i - \varepsilon\delta + \frac{[2 + (\varepsilon - 1)(1 + \theta)] (\alpha - i)^2}{[1 - (1 + \theta)(1 - R)] 2\sigma^2}. \quad (22)$$

Certainly, if $\theta = 0$, we get back to Obstfeld (1994): $g = \varepsilon(i - \delta) + (\varepsilon + 1) \frac{(\alpha - i)^2}{2R\sigma^2}$.

3.2 Comparative Statics

In the following, we begin to examine the long-run effects on consumption growth and consumption-wealth ratio of all sorts of changes of exogenous parameters.

3.2.1 The Effects of Changes of Expected Rate of Return of Risky Assets

Taking derivatives w.r.t α in (22) gives

$$\frac{dg}{d\alpha} = \frac{[2 + (\varepsilon - 1)(1 + \theta)] (\alpha - i)}{[1 - (1 + \theta)(1 - R)] \sigma^2}. \quad (23)$$

Different from Obstfeld (1994), we can not determine the sign of the derivative in equation (23). Taking derivative on equation (23) w.r.t θ gives rise to

$$\frac{d\left(\frac{dg}{d\alpha}\right)}{d\theta} = \frac{(1 + \varepsilon) - 2R}{[1 - (1 + \theta)(1 - R)]^2} \frac{\alpha - i}{\sigma^2} \begin{cases} > 0, 1 + \varepsilon > 2R \\ = 0, 1 + \varepsilon = 2R \\ < 0, 1 + \varepsilon < 2R \end{cases}. \quad (24)$$

Furthermore, we have

$$\left(\frac{dg}{d\alpha}\right)_{\theta>0} \begin{cases} > 0, 1 + \varepsilon \geq 2R \\ \text{in det er min ate, } 1 + \varepsilon < 2R \end{cases}. \quad (25)$$

When $1 + \varepsilon \geq 2R$ holds, $\left(\frac{dg}{d\alpha}\right)_{\theta>0} - \left(\frac{dg}{d\alpha}\right)_{\theta=0} > 0$. Comparing with the Obstfeld (1994) economy without mercantilism, the consumption growth rate is even bigger when a positive technology shock occurs. We call the newly addition of the growth rate “mercantilist premium” and the corresponding area of parameters “mercantilist area”, namely, $MP_\alpha \equiv \left(\frac{dg}{d\alpha}\right)_{\theta>0} - \left(\frac{dg}{d\alpha}\right)_{\theta=0}$, $MA_\alpha \equiv \{(\varepsilon, R) \in R_+^2 : 1 + \varepsilon \geq 2R\}$. However, the sign of $\left(\frac{dg}{d\alpha}\right)_{\theta>0}$ can not be determined in $\overline{MA}_\alpha \equiv \{(\varepsilon, R) \in R_+^2 : 1 + \varepsilon < 2R\}$. Because of the existence of mercantilism, the growth effects of technology shock depend on parameter values of the elasticity of intertemporal substitution and the coefficient of relative risk aversion. Comparing with the Obstfeld (1994) model, if the parameter values are in “mercantilist area”, the consumption growth rate will be even bigger; however, if not in “mercantilist area”, the sign of the derivative in equation (25) can not be determined, namely, the consumption growth rate may increase, decrease or keep constant. Actually, (25) tells us that if the elasticity of intertemporal substitution is large, mercantilism magnifies the positive growth effect of the positive technology shock, whereas mercantilism may magnify, reduce or keep the positive effect of the technology shock. The drop shadow part of figure 1 gives the “mercantilist area”.

(insert figure 1 here)

Taking derivative on equation (14) w.r.t α results in

$$\frac{d\mu}{d\alpha} = \frac{[(\varepsilon - 1)(1 + \theta)]}{[(1 + \theta)(1 - R) - 1]} \frac{\alpha - i}{\sigma^2}. \quad (26)$$

If there exists no mercantilism, i.e., $\theta = 0$, we get back to Obstfeld (1994), namely,

$$\left(\frac{d\mu}{d\alpha}\right)_{\theta=0} = \frac{1 - \varepsilon}{R} \frac{\alpha - i}{\sigma^2} \begin{cases} > 0, \varepsilon < 1 \\ = 0, \varepsilon = 1 \\ < 0, \varepsilon > 1 \end{cases}. \quad (27)$$

However, by taking derivative on equation (26) w.r.t θ , we obtain

$$\frac{d\left(\frac{d\mu}{d\alpha}\right)}{d\theta} = \frac{1 - \varepsilon}{[(1 + \theta)(1 - R) - 1]^2} \frac{\alpha - i}{\sigma^2} \begin{cases} > 0, \varepsilon < 1 \\ = 0, \varepsilon = 1 \\ < 0, \varepsilon > 1 \end{cases},$$

moreover,

$$\left(\frac{d\mu}{d\alpha}\right)_{\theta>0} = \begin{cases} > \left(\frac{d\mu}{d\alpha}\right)_{\theta=0} > 0, \varepsilon < 1 \\ = \left(\frac{d\mu}{d\alpha}\right)_{\theta=0} = 0, \varepsilon = 1 \\ < \left(\frac{d\mu}{d\alpha}\right)_{\theta=0} < 0, \varepsilon > 1 \end{cases}. \quad (28)$$

Comparing (28) with (27), we find that the signs of consumption-wealth ratio affected by expected rate of return are both determined by whether the elasticity of intertemporal substitution large than one: a rise in the real rate of return lowers consumption-wealth ratio when $\varepsilon > 1$, but raises it when $\varepsilon < 1$. Different from (27), (28) shows that though θ does not dominate the direction of the change of consumption-wealth ratio, mercantilism always magnifies these effects. Specifically, if $\varepsilon > 1$, consumption-wealth ratio becomes larger because of the increase of the real rate of return. The drop shadow part of figure 2 indicates the area of parameter where both consumption-wealth ratio and consumption growth rate are magnified by the existence of mercantilism: $\{(\varepsilon, R) \in R_+^2 : 1 + \varepsilon < 2R, \varepsilon < 1\}$.

(insert figure 2 here)

3.2.2 The Effects of Changes of Risk of Risky Assets

By taking derivative on equation (22) w.r.t σ , we have

$$\frac{dg}{d\sigma} = -\frac{[2 + (\varepsilon - 1)(1 + \theta)] (\alpha - i)^2}{[1 - (1 + \theta)(1 - R)] \sigma^3}. \quad (29)$$

If $\theta = 0$, we go back to Obstfeld (1994), i.e.,

$$\left(\frac{dg}{d\sigma}\right)_{\theta=0} = -\frac{\varepsilon + 1}{R} \frac{(\alpha - i)^2}{\sigma^3} < 0. \quad (30)$$

Since the sign of the derivative in (29) can not be determined directly, by taking derivative w.r.t θ , we have

$$\frac{d\left(\frac{dg}{d\sigma}\right)}{d\theta} = -\frac{(\varepsilon + 1) - 2R}{[1 - (1 + \theta)(1 - R)]^2} \frac{(\alpha - i)^2}{\sigma^3} \begin{cases} < 0, \varepsilon + 1 > 2R \\ = 0, \varepsilon + 1 = 2R \\ > 0, \varepsilon + 1 < 2R \end{cases}. \quad (31)$$

Combination of (30) and (31) leads to

$$\left(\frac{dg}{d\sigma}\right)_{\theta>0} \begin{cases} < 0, \varepsilon + 1 \geq 2R \\ \text{in det er min ate, } \varepsilon + 1 < 2R \end{cases}. \quad (32)$$

Different from the negative growth effect of the risky technology examined by Obstfeld (1994), (33) shows that how the long-run growth rate responds to risk shocks of risky assets depends on the values of preference parameters. If $\varepsilon + 1 \geq 2R$, an increase of the risk of risky assets will decrease the growth rate of the economy, and the existence of mercantilism aggravates this effect (since $\left(\frac{dg}{d\sigma}\right)_{\theta>0} \leq \left(\frac{dg}{d\sigma}\right)_{\theta=0} < 0$); if $\varepsilon + 1 < 2R$, the direction is indeterminate.

To examine the long-run effect on consumption-wealth ratio of the changes of σ , by taking derivative on (14) w.r.t σ , we get

$$\frac{d\mu}{d\sigma} = \frac{(1 - \varepsilon)(1 + \theta)}{[(1 + \theta)(1 - R) - 1]} \frac{(\alpha - i)^2}{\sigma^3}. \quad (33)$$

If $\theta = 0$, it returns to Obstfeld (1994), namely,

$$\left(\frac{d\mu}{d\sigma}\right)_{\theta=0} = \frac{(\varepsilon - 1)}{R} \frac{(\alpha - i)^2}{\sigma^3} \begin{cases} < 0, \varepsilon < 1 \\ = 0, \varepsilon = 1 \\ > 0, \varepsilon > 1 \end{cases}. \quad (34)$$

Moreover, taking derivative on (34) w.r.t θ results in

$$\frac{d\left(\frac{d\mu}{d\sigma}\right)}{d\theta} = \frac{\varepsilon - 1}{[(1 + \theta)(1 - R) - 1]^2} \frac{(\alpha - i)^2}{\sigma^3} \begin{cases} < 0, \varepsilon < 1 \\ = 0, \varepsilon = 1 \\ > 0, \varepsilon > 1 \end{cases} . \quad (35)$$

Combination of (34) and (35) tells us that

$$\left(\frac{d\mu}{d\sigma}\right)_{\theta>0} = \begin{cases} < \left(\frac{d\mu}{d\sigma}\right)_{\theta=0} < 0, \varepsilon < 1 \\ = \left(\frac{d\mu}{d\sigma}\right)_{\theta=0} = 0, \varepsilon = 1 \\ > \left(\frac{d\mu}{d\sigma}\right)_{\theta=0} > 0, \varepsilon > 1 \end{cases} . \quad (36)$$

Therefore, compared to Obstfeld (1994), the existence of mercantilism always enlarges consumption-wealth ratio effect of an increase of risk: if $\varepsilon < 1$, then the more risk the risky assets have, the decrease of consumption-wealth ratio is larger; if $\varepsilon > 1$, then the more risk, the increase of the ratio is larger; and if $\varepsilon = 1$, then the risk of risk assets has no effect on consumption-wealth ratio and then mercantilism cannot enlarge this effect.

Taking derivative on equation (22) w.r.t R leads to

$$\frac{dg}{dR} = -\frac{[2 + (\varepsilon - 1)(1 + \theta)]}{[1 - (1 + \theta)(1 - R)]^2} \frac{(\alpha - i)^2}{2\sigma^2} \begin{cases} > 0, \text{ iff } \varepsilon < \frac{\theta-1}{\theta+1} \\ = 0, \text{ iff } \varepsilon = \frac{\theta-1}{\theta+1} \\ < 0, \text{ iff } \varepsilon > \frac{\theta-1}{\theta+1} \end{cases} . \quad (37)$$

Hence, if $\varepsilon < \frac{\theta-1}{\theta+1}$, then the growth effect of the change of the relative risk aversion is positive; if $\varepsilon > \frac{\theta-1}{\theta+1}$, then the growth effect of risk attitudes is reverse; and if $\varepsilon = \frac{\theta-1}{\theta+1}$, then the effect is zero.

From equation (14), we obtain

$$\frac{d\mu}{dR} = \frac{(\varepsilon - 1)(1 + \theta)^2}{[(1 + \theta)(1 - R) - 1]^2} \frac{(\alpha - i)^2}{2\sigma^2} \begin{cases} > 0, \text{ iff } \varepsilon > 1 \\ = 0, \text{ iff } \varepsilon = 1 \\ < 0, \text{ iff } \varepsilon < 1 \end{cases} .$$

Then, the effect on consumption-wealth ratio of risk attitudes depends on whether the elasticity of intertemporal substitution is larger than 1. If the elasticity is larger than 1, then the consumption-wealth ratio effect of risk attitudes is positive; if the elasticity is less than 1, then the effect is reverse; and if the elasticity is equal to 1, then the effect is zero. The drop shadow part of figure 3 indicates the area of parameter values where the two effects of changes of risk attitudes are positive.

(insert figure 3 here)

3.2.3 The Effects of Changes of the EIS

Taking derivative on equation (22) w.r.t ε gives rise to

$$\frac{dg}{d\varepsilon} = (1 + \theta)i - \delta + \frac{1 + \theta}{[1 - (1 + \theta)(1 - R)]^2} \frac{(\alpha - i)^2}{2\sigma^2}. \quad (38)$$

It is difficult to find useful information from the above equation. Similar to Obstfeld (1994), we can find the risk-adjusted expected growth rate, namely,

$$g - \left[(1 - \theta) \frac{R\sigma^2\omega^2}{2} - \theta i \right] = \varepsilon(1 + \theta) \left\{ \left[\omega\alpha + (1 - \omega)i - \frac{R\sigma^2\omega^2}{2} \right] - \frac{\delta}{1 + \theta} \right\}. \quad (39)$$

The left side of (39) is the risk-adjusted expected growth rate, and the right side is the difference of the risk-adjusted expected rate of return and the time preference rate. We therefore have a result analogous to the deterministic growth model and Obstfeld (1994) stochastic growth model. Since the portfolio weight ω is independent of intertemporal substitution, a rise in the elasticity raises the expected growth rate whenever the risk-adjusted expected return on the optimal portfolio exceeds the adjusted time preference rate. However, without mercantilism, it will be back to the Obstfeld model

$$g - \frac{R\sigma^2\omega^2}{2} = \varepsilon(1 + \theta) \left\{ \left[\omega\alpha + (1 - \omega)i - \frac{R\sigma^2\omega^2}{2} \right] - \delta \right\}.$$

From equation (14), we obtain

$$\frac{d\mu}{d\varepsilon} = \delta - (1 + \theta) \left\{ i - \frac{1}{[(1 + \theta)(1 - R) - 1]} \right\} \frac{(\alpha - i)^2}{2\sigma^2}. \quad (40)$$

However, the sign of the derivative in equation (42) cannot be determined.

3.2.4 The Effects of Changes of the Time Preference Rate

By taking derivatives on equations (22) and (14) w.r.t δ respectively, we obtain

$$\frac{dg}{d\delta} = -\varepsilon < 0, \quad (41)$$

$$\frac{d\mu}{d\delta} = \varepsilon > 0. \quad (42)$$

The intuitive results in (41) and (42) are the same as Obstfeld (1994). An increase of the time preference rate affects both the growth rate and consumption-wealth ratio with the same degree but opposite directions. With the larger time preference rate, people have less patience and incline to consume ahead of time. Hence, the long-run growth rate is even low and the optimal consumption-wealth ratio is larger.

3.2.5 The Effects of Changes of the Spirit of Mercantilism

Taking derivative on equation (22) w.r.t θ results in

$$\frac{dg}{d\theta} = (\varepsilon - 1)i + \frac{(\varepsilon + 1) - 2R}{[1 - (1 + \theta)(1 - R)]^2} \frac{(\alpha - i)^2}{2\sigma^2}, \quad (43)$$

the sign of which cannot be determined. However, if the parameter values of the elasticity of intertemporal substitution and the relative risk aversion satisfy both $\varepsilon > 1$ and $\varepsilon + 1 > 2R$, then an increase of the spirit of mercantilism will increase the economic growth; if the parameter values satisfy both $\varepsilon < 1$ and $\varepsilon + 1 < 2R$, then an increase of the spirit of mercantilism will decrease the economic growth.

From equation (14), we have

$$\frac{dg}{d\theta} = (1 - \varepsilon) \left[i + \frac{(\alpha - i)^2}{2\sigma^2} \right] \begin{cases} < 0, \varepsilon > 1 \\ = 0, \varepsilon = 1 \\ > 0, \varepsilon < 1 \end{cases} .$$

Hence, an increase of the spirit of mercantilism will (i) decrease consumption-wealth ratio whenever $\varepsilon > 1$, (ii) increase consumption-wealth ratio whenever $\varepsilon < 1$, and (iii) have no effect on the ratio whenever $\varepsilon = 1$. Taking derivative on equation (19) w.r.t θ gives

$$\frac{d\omega}{d\theta} = \frac{1 - R}{[1 - (1 + \theta)(1 - R)]^2} \frac{\alpha - i}{\sigma^2} \begin{cases} > 0, R < 1 \\ = 0, R = 1 \\ < 0, R > 1 \end{cases} .$$

Then, an increase of the spirit of mercantilism will (i) increase the wealth weight invested in risky assets whenever $R < 1$, (ii) decrease the wealth weight invested in risky assets, and (iii) have no effect on the investment behavior of the individuals. Equation (19) shows that the portfolio weight on risky assets depends on the value of the coefficient of relative risk aversion

reversely. And the above result tells that the effect of portfolio choice of mercantilism also depends on individual's risk attitude: an increase of the development of mercantilism will increase the wealth weight on risky assets whenever the relative risk aversion is low, and vice versa.

Altogether, if the values of the elasticity of intertemporal substitution and relative risk aversion satisfy $M = \{(\varepsilon, R) \in R_+^2 : \varepsilon > 1, \varepsilon + 1 > 2R, R < 1\}$ (the drop shadow part of figure 4), the spirit of mercantilism has positive effects on both the long-run rate of economic growth and consumption-wealth ratio.

(insert figure 4 here)

3.2.6 Brief Summary-Indeterminacy of Comparative Statics

The results of comparative statics in the closed economy are different from Obstfeld (1994) largely. Obstfeld (1994) shows that the growth effects of technological and preference shocks can be determined easily. However, because of the existence of mercantilism, the effects of those shocks rely on parameter values of elasticity of intertemporal substitution, coefficients of relative risk aversion and spirit of mercantilism. In order to state this phenomena formally, we call this kind of indeterminacy of comparative statics as indeterminacy of economic growth.⁴In the following open economy case, by introducing heterogeneity of consumers, we will discuss the diversity of economic growth, which corresponds to indeterminacy of economic growth in the closed economy.

Substituting equations (14) and (22) into (13) leads to the expression for optimal social welfare

$$J(W) = \left[\varepsilon\delta - \frac{(\varepsilon - 1)(1 + \theta)(i + g + \varepsilon\delta)}{2 + (\varepsilon - 1)(1 + \theta)} \right]^{\frac{1-R}{1-\varepsilon}} \frac{(W^{1+\theta} / (1 + \theta))^{1-R}}{1 - R}. \quad (44)$$

From (44), a useful property of the economy should be noted: when the economy holds both types of capital, the technology parameters α and σ influence the individual's lifetime utility only through their effects on the growth rate, g . The property of the model turns out to be useful in evaluating the growth effects of international asset-market integration.

⁴The indeterminacy defined here is different from the definition of multiple convergent paths put forward by Benhabib and Perli (1994), and Benhabib and Farmer (1994).

4 Global Economic Integration and Economic Growth

4.1 Global Equilibrium in an Open Economy

All of the discussion above can be extended to a multicountry world economy. Since Merton (1971)'s mutual-fund theorem is still held in the framework of multicountry open economies, we can not only transform the discussion on indeterminacy of economy growth in the closed economy into the discussion on the diversity of economic growth in the open economy, but also examine the diverse effect on economic growth of international economic integration.

Let there be N countries, indexed by $j = 1, 2, \dots, N$. Each country has a representative resident with preferences of the form specified in (1) and (2) or in (3). However, preferences may be country-specific. Country j 's representative individual has a RRA coefficient R_j , an EIS ε_j , a time preference rate δ_j , and the spirit of mercantilism θ_j . Hence, the representative individual of country j has the utility function form

$$U^j(t) = \left\{ \left[\frac{(C_j(t)W_j(t)\theta_j)^{1-R_j}}{1-R_j} \right]^{\frac{1-\frac{1}{\varepsilon_j}}{1-R_j}} h + e^{-\delta_j h} [E_t U^j(t+h)]^{\frac{1-\frac{1}{\varepsilon_j}}{1-R_j}} \right\}^{\frac{1-R_j}{1-\frac{1}{\varepsilon_j}}}. \quad (45)$$

Assume that there exists only one safe asset and its rate of return i^* is common to all countries. Each country j has only one risky asset and the cumulative value of a unit investment in country j 's risky capital follows the geometric diffusion

$$\frac{dV_j^K(t)}{V_j^K(t)} = \alpha_j dt + \sigma_j dz_j(t), \quad j = 1, 2, \dots, N. \quad (46)$$

It is assumed that N country-specific technology shocks follow the instantaneous correlation structure

$$dz_j dz_k = \rho_{jk} dt, \quad j, k = 1, 2, \dots, N. \quad (47)$$

Similar to Svensson (1989) and Obstfeld (1994), the optimal vector of portfolio weights for N risky assets of an individual from country j can be

derived as follows:

$$\omega_j \equiv (\omega_{j1}, \omega_{j2}, \dots, \omega_{jN})' = \frac{\Omega^{-1}(\alpha - i^*e)}{[1 - (1 + \theta_j)(1 - R_j)]}, \quad (48)$$

where

$\omega_j \equiv (\omega_{j1}, \omega_{j2}, \dots, \omega_{jN})'$ stands for the optimal portfolio for N risky assets of the representative individual of country j ;

$$\Omega = [\sigma_j \sigma_k \rho_{jk}]_{N \times N} = \begin{bmatrix} \sigma_1^2 & \sigma_1 \sigma_2 \rho_{12} & \dots & \sigma_1 \sigma_N \rho_{1N} \\ \sigma_2 \sigma_1 \rho_{21} & \sigma_2^2 & \dots & \sigma_2 \sigma_N \rho_{2N} \\ \dots & \dots & \dots & \dots \\ \sigma_N \sigma_1 \rho_{N1} & \sigma_N \sigma_2 \rho_{N2} & \dots & \sigma_N^2 \end{bmatrix} \text{ is the } N \times$$

N variance-covariance matrix;

$\alpha \equiv (\alpha_1, \alpha_2, \dots, \alpha_N)'$ is the vector of expected rate of return of all of the risky assets;

$e = (1, 1, \dots, 1)'$ is the constant vector whose every entry is 1;

θ_j and R_j are the spirit of mercantilism and relative risk aversion coefficient, respectively.

Equation (50), as noted above, implies that the individual holds a portfolio with the same weights of risky assets or a mutual fund on risky assets. Namely, the proportions in which individuals wish to hold the risky assets are independent of nationality, which means that the mutual-fund theorem put forward by Merton (1971) is also held. Normalizing equation (48) leads to the $N \times 1$ vector of the mutual fund

$$\varpi \equiv (\varpi_1, \varpi_2, \dots, \varpi_N)' = \frac{1}{e' \omega_j} \omega_j = \frac{\Omega^{-1}(\alpha - i^*e)}{e' \Omega^{-1}(\alpha - i^*e)}. \quad (49)$$

Obviously, the portfolio weight of the mutual fund presented by (49) is a constant vector independent of preference and endowment. By the mutual-fund theorem, it is appropriate to take all of the risky assets in the market as a mutual fund or a risky asset with expected rate of return

$$\alpha^* = \varpi' \alpha = \alpha' \varpi, \quad (50)$$

and return variance

$$\sigma^{*2} = \varpi' \Omega \varpi. \quad (51)$$

Let ω_j^* be the wealth weight invested on the risky fund by country j 's individual. By the procedure in the mathematical appendix, we have

$$\omega_j^* = \omega'_j e = e' \omega_j = \frac{(\alpha^* - i^*)}{[1 - (1 + \theta_j)(1 - R_j)]\sigma^{*2}}. \quad (52)$$

To envision equilibrium, imagine that N autarkic economies are opened up to free multilateral trade. Since all types of capital can be freely transformed into each other, there may be no change in the relative prices of assets, which are fixed at 1. In this world economy, the supply of capital is infinite. Given the world real interest rate, i^* , and the technology parameters, α and Ω , the clearance of the global capital market is implemented by balancing its demand. It will generally turn out that world investors desire to go short in some countries risky capital stocks. Since this is not possible in the aggregate, these capitals will be swapped into other forms and the associated activities will shut down. In equilibrium, the remaining $M \leq N$ risky capital stocks make up a market portfolio whose proportions are specified by the mutual-fund theorem. To simplify analysis, it is assumed that investors in each country will hold both the risk-free asset and the mutual fund composed of M risky assets.

Assume that $M \leq N$ risky capital stocks remain in operation after trade is opened in the world capital market and that they are available in the positive quantities K_1, K_2, \dots, K_M . To conserve on notation, let $\alpha \equiv (\alpha_1, \alpha_2, \dots, \alpha_M)'$ denote the subvector of mean returns, $\Omega = [\sigma_j \sigma_k \rho_{jk}]_{N \times N}$ denote the associated $M \times M$ covariance matrix of returns, $\varpi \equiv (\varpi_1, \varpi_2, \dots, \varpi_M)'$ = $\frac{\Omega^{-1}(\alpha - i^* e)}{e' \Omega^{-1}(\alpha - i^* e)}$ denote the portfolio weights of the mutual fund, $\alpha^* = \varpi' \alpha$ denote the mean of the mutual fund, $\sigma^{*2} = \varpi' \Omega \varpi$ denote its variance of the mutual fund. Then an equilibrium must satisfy the conditions:

$$\frac{K_j}{\sum_{j=1}^M K_j} = \varpi_j, \quad j = 1, \dots, M, \quad (53)$$

$$\sum_{j=1}^M K_j = \sum_{j=1}^N \varpi_j W_j = \sum_{j=1}^N \frac{(\alpha^* - i^*)}{[1 - (1 + \theta_j)(1 - R_j)]\sigma^{*2}} W_j. \quad (54)$$

The left side of equation (53) denotes the weight of the j -th capital in total risky capitals, and the right side denotes the wealth fraction invested in the j -th risky capital by each investor. By the mutual-fund theorem, the right side can be taken as the ratio of the sum of all investors' demand for the j -th risky asset to the total social wealth. Altogether, (53) stands for the

clearance of the j -th capital market. Similarly, equation (54) stands for the clearance of world risky assets market in the aggregate.

By the discussion of the closed economy and equation (39), country j 's mean growth rate can be derived as

$$g_j^* = [1 + (\varepsilon_j - 1)(1 + \theta_j)] i^* - \varepsilon_j \delta_j + \frac{[2 + (\varepsilon_j - 1)(1 + \theta_j)] (\alpha^* - i^*)^2}{[1 - (1 + \theta_j)(1 - R_j)] 2\sigma^{*2}}. \quad (55)$$

Equation (57) shows that in a integrated world equilibrium national consumption levels can grow at different rates on average despite the single risk-free interest rate i^* prevailing in all countries. If $\theta_j = 0$, (55) degenerates to the result of the Obstfeld model.

4.2 Comparative Statics and Diversity of Economic Growth

By the discussion of the closed economy and equation (55), for country j whose parameter values satisfy $1 + \varepsilon_j > 2R_j$, $(\varepsilon_j, R_j) \in R_+^2$, an increase of the expected rate of return of the risk mutual fund improves the growth rate of consumption. Furthermore, compared to the Obstfeld model, mercantilism strengthens this positive effect and leads to a mercantilist premium. However, for country j whose parameter values satisfy $1 + \varepsilon_j \leq 2R_j$, $(\varepsilon_j, R_j) \in R_+^2$, the growth effect of an increase of mean return of the mutual fund is indeterminate, namely, the growth effect may be positive, negative or zero. Obstfeld (1994) tells that with different values of preference parameters, the consumption growth rates of all of the countries are improved in the face of an increase of mean return of the mutual fund. Different from Obstfeld (1994), the paper shows that for those countries with large value of EIS, the growth rate is improved, and improved more; however, for countries with small value of EIS, the change of the growth rate is indeterminate. It is not difficult to conjecture the reason for this. Mercantilism pays attention to the accumulation of wealth. For the patient countries with large value of EIS, the existence of mercantilism aggravates people's pursuits for specialized and hence inherently risky assets. Hence, on one hand, the countries with more patience gain more rapid growth; on the other hand, other countries with less patience may grow more rapidly, more slowly or keep constant, which maybe come from the tradeoffs of the accumulative effects of mercantilism and negative savings effects of small value of EIS.

Similar to the growth effect of an increase of mean return of the mutual fund, for country j whose parameter values satisfy $1 + \varepsilon_j > 2R_j$, $(\varepsilon_j, R_j) \in R_+^2$, a decrease of the risk of risky technologies improves the consumption growth rate and mercantilism strengthens this positive effect. However, for countries whose parameter values satisfy $1 + \varepsilon_j \leq 2R_j$, $(\varepsilon_j, R_j) \in R_+^2$, the growth effect of a decrease of risk is indeterminate. Obstfeld (1994) shows that the consumption growth rates of all of the countries are improved facing a decrease of risk of risky assets. In the paper, in the face of the reduced risk, mercantilism enforces the wealth accumulation of patient countries; however, for the impatient countries, there exist more tradeoffs between the accumulation effects of mercantilism and the dissavings effects of impatience and hence the net effect is indeterminate.

For an exogenous increase of RRA, different from Obstfeld (1994) which shows that the consumption growth rates of all countries decrease, for countries whose parameter values satisfy $\varepsilon_j < \frac{\theta_j - 1}{\theta_j + 1}$, their growth rates increase; for countries whose parameter values satisfy $\varepsilon_j > \frac{\theta_j - 1}{\theta_j + 1}$, their growth rates decrease; for those countries whose parameter values satisfy $\varepsilon_j = \frac{\theta_j - 1}{\theta_j + 1}$, their growth rates keep constant.

By equation (39), we have

$$g_j - \left[(1 - \theta_j) \frac{R_j \sigma^{*2} \omega_j^2}{2} - \theta_j i^* \right] = \varepsilon_j (1 + \theta_j) \left\{ \left[\omega_j \alpha^* + (1 - \omega_j) i^* - \frac{R_j \sigma^{*2} \omega_j^2}{2} \right] - \frac{\delta_j}{1 + \theta_j} \right\}. \quad (56)$$

Therefore, for countries whose parameter values satisfy $\omega_j \alpha^* + (1 - \omega_j) i^* - \frac{R_j \sigma^{*2} \omega_j^2}{2} > \frac{\delta_j}{1 + \theta_j}$, their risk-adjusted expected growth rates increase with an exogenous increase of EIS; for countries whose parameter values satisfy $\omega_j \alpha^* + (1 - \omega_j) i^* - \frac{R_j \sigma^{*2} \omega_j^2}{2} < \frac{\delta_j}{1 + \theta_j}$, their risk-adjusted expected growth rates decrease with an exogenous increase of EIS; and for countries whose parameter values satisfy $\omega_j \alpha^* + (1 - \omega_j) i^* - \frac{R_j \sigma^{*2} \omega_j^2}{2} = \frac{\delta_j}{1 + \theta_j}$, their risk-adjusted expected growth rates are independent of EIS.

For the growth effects of changes of the spirit of mercantilism, for countries whose preference parameter values satisfy $\varepsilon_j + 1 > 2R_j$ and $\varepsilon_j > 1$, with more stronger mercantilist development, the long-run growth rate will be higher; for countries whose preference parameter values satisfy $\varepsilon_j + 1 < 2R_j$ and $\varepsilon_j < 1$, with more stronger mercantilist development, the long-run growth rate will be lower; and for countries whose preference parameters

are valued in other cases, the growth effect of changes of mercantilist development is indeterminate.

4.3 Global Economic Integration and Diversity of Economic Growth

Next we examine the impact of global economic integration on growth. We consider the case in which all countries hold riskless capital before integration and some continue to hold it afterward. In this case, countries share a common risk-free interest rate both before and after integration. Because different types of capital are costlessly interchangeable, economic integration does not change any country's wealth. Furthermore, in the present distortion-free setting, trade after integration must raise welfare. In the Obstfeld (1994) model, both growth and welfare have the same direction of change. Then, economic intergration raises welfare and hence raises growth. In our model, the direction of motion between the two variables depends on the parameter values, and hence the growth effects of economic integration presents diversities.

By equation (44), we have

$$J(W_j) = \left[\varepsilon_j \delta_j - \frac{(\varepsilon_j - 1)(1 + \theta_j)(i^* + g_j + \varepsilon_j \delta_j)}{2 + (\varepsilon_j - 1)(1 + \theta_j)} \right]^{\frac{1-R_j}{1-\varepsilon_j}} \frac{\left(W_j^{1+\theta_j} / (1 + \theta_j) \right)^{1-R_j}}{1 - R_j}. \quad (57)$$

Taking derivative on equation (57) w.r.t g_j^* leads to

$$\frac{dJ_j}{dg_j^*} = \left(\frac{W_j^{1+\theta_j}}{1 + \theta_j} \right)^{1-R_j} \left[\varepsilon_j \delta_j + \frac{(1 - \varepsilon_j)(1 + \theta_j)(i^* + g_j^* + \varepsilon_j \delta_j)}{2 + (\varepsilon_j - 1)(1 + \theta_j)} \right] \frac{(1 + \theta_j)}{2 + (\varepsilon_j - 1)(1 + \theta_j)}. \quad (58)$$

Then, we have

$$\frac{dJ_j}{dg_j^*} \begin{cases} > 0, \varepsilon_j > \frac{\theta_j - 1}{\theta_j + 1} \\ = 0, \varepsilon_j = \frac{\theta_j - 1}{\theta_j + 1} \\ < 0, \varepsilon_j < \frac{\theta_j - 1}{\theta_j + 1} \end{cases}. \quad (59)$$

It is easy to find that the optimal social welfare and long-run growth rate have different direction of motion corresponding to different parameter values.

Specifically, three cases occur: case 1, if $\varepsilon_j > (\theta_j - 1)/(\theta_j + 1)$, welfare and growth have the same direction of motion. Hence, economic integration raises social welfare and hence raise the long-run growth; case 2, if $\varepsilon_j < (\theta_j - 1)/(\theta_j + 1)$, welfare and growth have the opposite direction of motion. Though economic integration raises social welfare, it reduces the long-run rate of economic growth; case 3, if $\varepsilon_j = (\theta_j - 1)/(\theta_j + 1)$, the optimal social welfare is independent of the optimal growth rate. Therefore, the change of growth can not be determined.

Altogether, in the world open economy with mercantilism, economic globalization does not accelerate economic growth of all of the countries. The preference parameters of consumers, especially EIS and mercantilist sentiments result in the diversify of growth in different countries. The theoretical inquiry accords with the experiences of economic globalization. Based on the data set of economic globalization from 1960s to 1990s, it is easy to find that unlike what Obstfeld (1994) had predicted, different countries experience different growth effects of economic globalization: some countries grow faster, some countries grow slower and others keep constant.

5 Main Conclusions and Policy Suggestions

By introducing Zou (1997)'s viewpoints of mercantilism into the Obstfeld (1994) model, the paper reexamines the intrinsic relationship among mercantilism, economic globalization, financial openness and growth theoretically. The main conclusions of the paper embody the following two aspects. On one hand, in face of the same technological and preference shocks, different countries with different parameter values will experience different directions of change; furthermore, mercantilism usually magnifies these effects. On the other hand, though the optimal welfare levels of all countries are increased, economic growth presents diversifies largely. And for some countries, globalization does harm to their economic growth. Therefore, economic integration and financial openness are not always profitable for all countries. The reason for these results is that mercantilism intensifies people's pursuits for high-risk and high-yield capital and distorts economic growth of the world economy.

The theoretical research of this paper not only can explain the real economic data, but also has strong policy suggestions. Firstly, do not believe in economic globalization and financial openness blindly. Globalization does good to growth only if the preference parameter values are in reasonable

scopes. It will be appropriate to adjust the steps of globalization. Secondly, to boost economic growth of a country, it is useful to calibrate the parameter values of the native residents. Furthermore, in order to utilize the advantages of economic globalization, it maybe helpful to induce people to change their habits. Thirdly, generally, globalization can increase the welfare of the domestic residents with the possibility of doing harm to economic growth. Hence, it is important to understand and guard against the risks and losses. It is not reasonable to believe in globalization blindly.

6 Mathematical Appendix

In this mathematical appendix, we derive the wealth weight on the risky fund by country j 's individual:

$$\begin{aligned}
\omega_j^* &= \omega'_j e = e' \omega_j = \frac{e' \Omega^{-1} (\alpha - i^* e)}{[1 - (1 + \theta_j)(1 - R_j)]} \\
&= \frac{e' \Omega^{-1} (\alpha - i^* e)}{[1 - (1 + \theta_j)(1 - R_j)]} \frac{(\alpha - i^* e)' \Omega^{-1} (\alpha - i^* e)}{(\alpha - i^* e)' \Omega^{-1} \Omega \Omega^{-1} (\alpha - i^* e)} \\
&= \frac{e' \Omega^{-1} (\alpha - i^* e)}{[1 - (1 + \theta_j)(1 - R_j)]} \frac{(\alpha - i^* e)' \Omega^{-1} (\alpha - i^* e)}{\varpi' [e' \Omega^{-1} (\alpha - i^* e)] \Omega \varpi [e' \Omega^{-1} (\alpha - i^* e)]}, \text{ by (49)} \\
&= \frac{(\alpha - i^* e)' \left\{ \frac{\Omega^{-1} (\alpha - i^* e)}{e' \Omega^{-1} (\alpha - i^* e)} \right\}}{[1 - (1 + \theta_j)(1 - R_j)]} \\
&= \frac{(\alpha - i^* e)' \varpi}{[1 - (1 + \theta_j)(1 - R_j)]}, \text{ by (49)} \\
&= \frac{(\alpha^* - i^*)}{[1 - (1 + \theta_j)(1 - R_j)] \sigma^{*2}}. \text{ by (50) and (51)}
\end{aligned}$$

References

- [1] Aizenman, J. and J. Lee, 2007. International reserves: precautionary versus mercantilist view, theory and evidence. *Open Economic Review*, 18, 191-214.
- [2] Cameron, R., 1993. *A concise economic history of the world: from paleolithic times to the present*. Oxford University Press.

- [3] Chen, K. 2012. Analysis of the great divergence under a unified endogenous growth model. *Annals of Economics and Finance*, 13-1, 325-361.
- [4] Dollar, D., and A. Kraay, 2001. Trade, growth and poverty. NBER.
- [5] Duffie, D., and L. Epstein, 1992. Stochastic differential utility. *Econometrica*, 60(2), 353-394.
- [6] Durdu, C., E. Mendoza and M. Terrones, 2009. Precautionary demand for foreign assets in sudden stop economies: an assessment of the new mercantilism. *Journal of Development Economics*, 89, 194-209.
- [7] Eaton, J., 1981. Fiscal policy, inflation and the accumulation of risky capital. *Review of Economic Studies*, 48, 435-445.
- [8] Epstein, L., and S. Zin, 1989. Substitution, risk aversion, and the temporal behavior of consumption and asset returns: a theoretical framework. *Econometrica*, 57, 937-969.
- [9] Epstein, L., and S. Zin, 1991. Substitution, risk aversion, and the temporal behavior of consumption and asset returns: an empirical framework. *The Journal of Political Economy*, 99, 263-286.
- [10] Grossman, G., and E. Helpman, 1991. Innovation and growth in the global economy. Cambridge MA: MIT Press.
- [11] Heckscher, E., 1935. Mercantilism. London: Allen & Unwin.
- [12] Irwin, D., 1991. Mercantilism as strategic trade theory: the Anglo-Dutch rivalry for the East India trade. *Journal of Political Economy*, 99, 1296-1314.
- [13] Jalles, J.T., 2009. Do oil prices matter? the case of a small open economy. *Annals of Economics and Finance*, 10-1, 65-87.
- [14] Keynes, J.M., 1936. The general theory of employment, interest and money. Cambridge University Press.
- [15] Lucas, R., 1988. On the mechanics of economic development. *Journal of Monetary Economics*, 22, 3-42.

- [16] McDermott, J., 1999. Mercantilism and economic growth. *Journal of Economic Growth*, 4, 55-80.
- [17] Merton, R., 1971. Optimum consumption and portfolio rules in a continuous-time model. *Journal of Political Economy*, 3, 373-413,
- [18] Obstfeld, M., 1994. Risk-taking, global diversification, and growth. *The American Economic Review*, 84(5), 1310-1329.
- [19] Razin, A., E. Sadka, and C. Yuan, 2000, Do debt flows crowd out equity flows or the other way round? *Annals of Economics and Finance*, 1, 33-47.
- [20] Romer, P., 1986. Increasing returns and long-run growth. *Journal of Political Economy*, 96, 1002-37.
- [21] Romer, P., 1990. Endogenous technological changes. *Journal of Political Economy*, 98, 71-102.
- [22] Samuelson, P., 1964. Theoretical notes on trade problems. *The Review of Economics and Statistics*, 46, 145-154.
- [23] Schumpeter, J., 1954. *History of economic analysis*. Oxford University Press.
- [24] Smith, A., 1776. *An inquiry into the nature and causes of the wealth of nations*. World Publishing Corporation (2009).
- [25] Svensson, L., 1989. Portfolio choice with non-expected utility in continuous time. *Economics Letters*, 30, 313-317.
- [26] Viner, J., 1937. *Studies in the theory of international trade*. New York: Harper and Brothers Publishers.
- [27] Viner, J., 1948. Power versus plenty as objectives of foreign policy in the seventeenth and eighteenth centuries. *World Politics*, vol. 1, No. 1.
- [28] Viner, J., 1968. Mercantilist thought. In *The International Encyclopedia of the Social Sciences*, Eds. by Sill, D., Vol. 4, 435-443.
- [29] Weil, P., 1989. The equity premium puzzle and the risk-free rate puzzle. *Journal of Monetary Economics*, 24, 401-421.

- [30] Weil, P., 1990. Nonexpected utility in macroeconomics. *Quarterly Journal of Economics*, 105, 29-42.
- [31] Zou, H., 1997. Dynamic analysis in the Viner model of mercantilism. *Journal of International Money and Finance*, 16(4), 637-651.

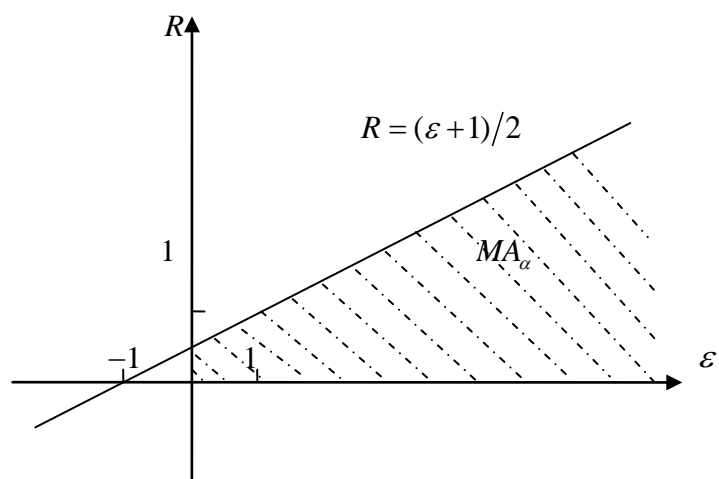


Figure 1: The drop shadow part stands for the “mercantilist area”

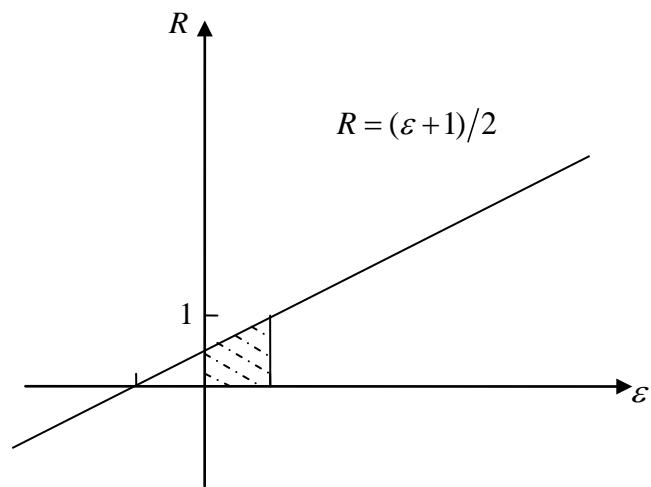


Figure 2: The drop shadow part gives the parameter values where both the growth rate and consumption-wealth ratio are improved

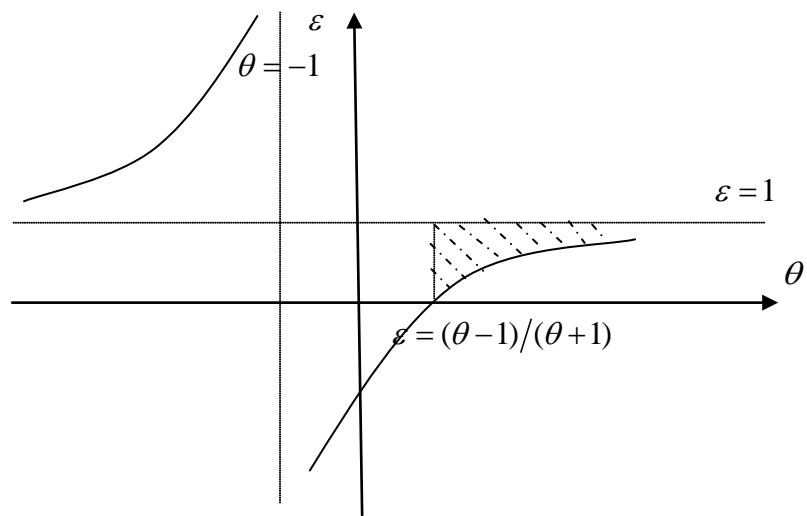


Figure 3: The drop shadow part gives the parameter values where both the growth rate and consumption-wealth ratio are improved

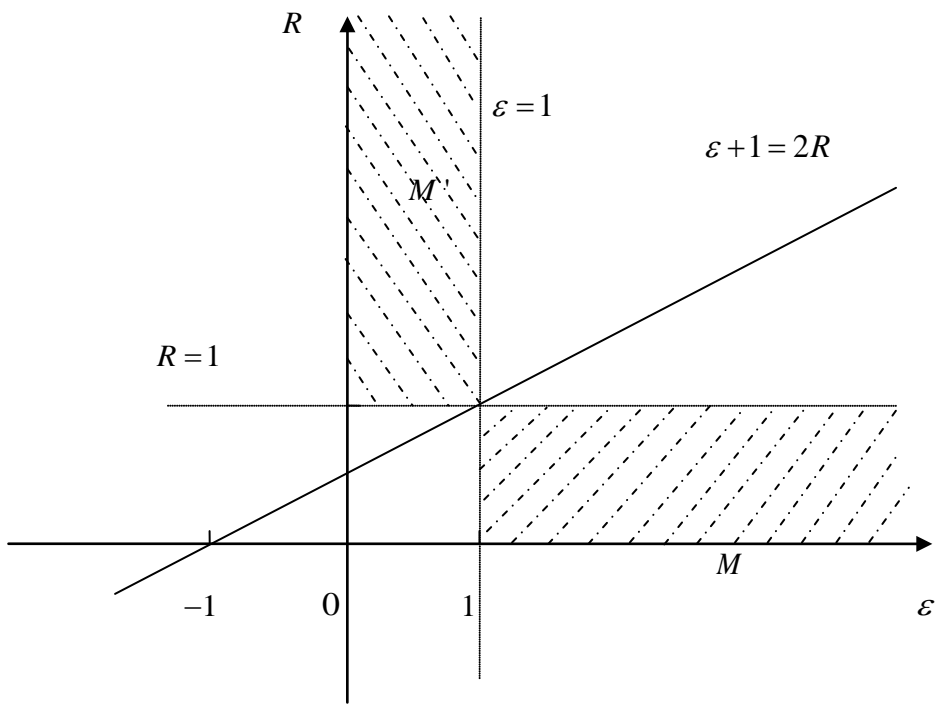


Figure 4: M gives the parameter values applicable to the development of mercantilism