Chapter 4

Answer the Market 7% Problem at the Break-Even Point of Primary Balance: Endogenous Evidences with Fiscal Policy

4.1 Introduction: Background of the Market 7% Break-even Point Problem

This chapter discusses the primary balance of deficit and connects it with external data at the markets. A unique finding is BOX 4-1 in this chapter. Chapter 2 summarized the existence of the neutrality of the financial/market assets to the real assets. Therefore, this chapter is naturally related to that neutrality as a background. Chapter 3, the last chapter, examined empirical results of deficit and net investment and connected those results with the rate of technological progress. This chapter raises the rate of return at the endogenous system, to compare the rate of return with an external rate of interest at the markets. The relationship between capital and the rate of return will be treated at Chapter 6.

There are many important policy-oriented factors to determine the break-even point of primary balance to *GDP* in the government sector, as shown by the definition of the market 7% problem such that if deficit after reducing interest (primary balance) to *GDP* is beyond 7%, deficit might increase by year and forever. These factors have been analyzed by using several statistical data-sets[1] currently available. The author never denies statistical and specified efforts of data arrangements: without these efforts any new data-sets do not exist today. It is a strict fact that each data of estimated data-sets are all within a certain range of corresponding data at endogenous data-sets. One approaches indirectly and the other directly to theoretical values since endogenous data at a purely endogenous system are theoretically measured, with devices at the initialization setting and without indexing and tautology. Also it is a fact that the markets intuitively know everything trustworthily, but the market principle is vertically separated by labor, capital, and commodity, staying at the second best in the economic society for hundreds years. The intuitive results are not always moderate and often short-sighted because the markets are operated by human whose character is inevitably profit-oriented, particularly with the world globalization.

[1] For essential differences between author's KEWT database and the current databases, see Chapter 6. The author converts time functions in the literature to policy functions at KEWT. The author intends to compare the KEWT with those of http://correlatesofwar.org/ , http://www.euklems.net, and http://www.pwt.econ.upenn.edu/, from viewpoint of a converted whole system. KEWT might be a converted final expression of Durlauf, S. N. and Kourtellos, A, Minkin, A. (2001) that uses the local Solow growth model and also vector index variables for initialization.

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Elements related to the market 7% problem are: Minus interest rates, nominal and real rates of returns, the rates of inflation and deflation, liquidation of debts, the relationship between the rate of returns at the real assets and the market ten year debt yield. Under an assumption of the neutrality of the financial assets to the real assets in equilibrium, market elements may be replaced by real asset elements within the framework of a system for national accounts (the SNA, 1993, 2008). Today, however, market elements are only available at the markets under the price-equilibrium. The markets under the price-equilibrium determine market elements intuitively, and causes and effects are estimated using methodology of econometrics. A problem under the price-equilibrium is that there is no methodology to integrate various markets and measure a wholly consistent system by country. This is because the general equilibrium is static. For the proof of the above neutrality, the endogenous system is able to show a table of 10 year debt yield divided by the rate of return measured in the endogenous-equilibrium, as shown in **Table 1**. It is difficult to formulate market equations dynamically under the price-equilibrium and support the general equilibrium. As a result, it is difficult to prove the market 7% problem theoretically and empirically, unless such as an endogenous system is introduced.

BOX 4-1 Market ÷ endogenous table: 10 year debt yield divided by the rate of return in equilibrium

	Market rate (10 year debt yield)									
Endoge. r*	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10
0.01	**1.000**	2.000	3.000	4.000	5.000	6.000	7.000	8.000	9.000	10.000
0.02	0.500	**1.000**	1.500	2.000	2.500	3.000	3.500	4.000	4.500	5.000
0.03	0.333	0.667	**1.000**	1.333	1.667	2.000	2.333	2.667	3.000	3.333
0.04	0.250	0.500	0.750	**1.000**	1.250	1.500	1.750	2.000	2.250	2.500
0.05	0.200	0.400	0.600	0.800	**1.000**	1.200	1.400	1.600	1.800	2.000
0.06	0.167	0.333	0.500	0.667	0.833	**1.000**	1.167	1.333	1.500	1.667
0.07	0.143	0.286	0.429	0.571	0.714	0.857	**1.000**	1.143	1.286	1.429
0.08	0.125	0.250	0.375	0.500	0.625	0.750	0.875	**1.000**	1.125	1.250
0.09	0.111	0.222	0.333	0.444	0.556	0.667	0.778	0.889	**1.000**	1.111
0.10	0.100	0.200	0.300	0.400	0.500	0.600	0.700	0.800	0.900	**1.000**

Note: The above *diagonal* down to the right shows 1.000 and expresses a perfect neutrality of the financial/market assets to the real assets. The neutrality preferably requires a steady or constant value such as 0.8 or 1.2 even if it does not show 1.000. The rate of return at the endogenous system shows $r = r^* = r_0$, as discussed at Chapter 6.

This paper intends to answer the market 7% problem theoretically and empirically, using each element available at KEWT data-sets the endogenous system measures. This is because initialization devices of KEWT data-sets enables the endogenous system to work consistently by country, sector, year, and over years, and without any given data at the starting year. The endogenous system is based on a discrete Cobb-Douglas production function, where continuous equations, log-growth, and differentials each have

no meaning to data-setting. No article has established the discrete C-D production function hitherto. The discrete C-D production function endogenously measures the rate of technological progress, as the product of the ratio of net investment to output/income and the qualitative net investment coefficient, 1−*beta*, in equilibrium. Seven endogenous parameters are simultaneously measured; the ratio of net investment to output, the rate of change in population, the relative share of capital, the diminishing returns to capital coefficient, the capital-output ratio, the ratio of government net investment to government output, and the speed year coefficient, *lambda*, in equilibrium. The speed year equation for convergence at the transitional path includes all the seven endogenous parameters and directly measures the level of the endogenous-equilibrium. The speed years for convergence in the endogenous-equilibrium[2] differ from the speed year equation as shown by Barro and Sala-i-Martin, Xavier (1995) and Bart, van Ark (1996): Endogenously versus 'exogenously' using panel data, whose causes are not wholly clarified as a system.

The endogenous system simultaneously clarifies the cause and result relationship, measuring seven endogenous parameters at the real assets. This is partly because the system starts with the relationship between the balance of payments, deficit, and the difference between private saving and private net investment, free from deficit defined by cash flow-in and -out. Related to seven endogenous parameters, four structural ratios are specified for policy-makers: The qualitative net investment coefficient, the relative share of capital, *alpha*, the capital-output ratio, *Omega*, and the rate of return, *r*, which is the relative share of capital divided by the capital-output ratio. The rate of return equation is tightly connected with the growth rate of output equation, reorganizing Phelps' (1961, 65, 66) golden age to optimum consumption and golden rule to investment and formulating the endogenous coefficient between growth and returns by sector. This is because returns or profits are endogenously measured by sector.

Four structural ratios dynamically clarify simultaneous causes and results, with the speed years by country, sector, and year. Actual and estimated data in the literature definitely stay at a moderate range of endogenous data in equilibrium. When actual data are far from endogenous data, policy-makers are unable to control four structural ratios and face at close-to-disequilibrium or disequilibrium. In short, results of the speed years are another expression of the endogenous-equilibrium, sustainable growth and returns, and moderate balance between the government (G) and private (PRI) sectors, where the total economy is expressed as two sector weighted aggregation. A variety of symptoms to equilibrium are individualistic and each country never has the same results by year and over years. These results are wholly caused back by fiscal policy and reflect different

[2] The endogenous speed years for convergence by sector are $1/\lambda^*$, $1/\lambda^*{}_G$, and $1/\lambda^*{}_{PRI}$, where the speed year coefficient for the total economy is shown by $\lambda^* = (1-\alpha)n + (1-\delta_0)g_A^*$, the rate of change in population in equilibrium is $n_E = n$, and the rate of technological progress is $g_A^* = i(1-\beta^*)$ (for basic endogenous equations, see *Notations* at the beginning of Monograph).

levels of philosophy and long-sighted leadership by country.

The upper limit of the market interest rate to debt by country is supposed to be 7%, according to the information at the markets. This paper clarifies whether the market 7% problem is plausible or not, using the endogenous structure of primary balance by country. The market 7% problem is revealed by connecting the financial assets with the real assets at the SNA. United theory (the endogenous system) and practice (data-sets) by country answer the market 7% problem in reality and, safely under the neutrality of the financial/market assets to the real assets in equilibrium.[3]

The author respects the market principle, perceives a fact that financial market policies by policy-makers, leaders, and the central banks among countries are indispensable, and evaluates the importance such that they have tried to recover economic activities in the global world economies. Activities executed by leaders, however, remain symptomatic treatments and countermeasures. In fact, once or twice bubbles have been repeated, without solving essential problems and at the sacrifice of future generations. The story is expressed: Leaders or captains continue to sail in the universe sea, without having endogenous lighthouse or means. Goal is sustainable growth with full-employment and low inflation. Nevertheless, the financial/market assets do not clarify necessary conditions at the real assets. This paper aims at clarifying real rules behind the break-even point of primary balance.

4.2 Reorganizing Exogenous Du Grauwe' Equations to Answer the Market 7% Problem

The market 7% problem has been positively and negatively discussed at the markets and under the market principle. The market principle has been the second best since no other way has been found. In reality, the market 7% problem is involved in hidden relationships between the financial assets and the real assets. The financial assets and related markets have been integrated with the real assets, partially and not wholly at all. If the real assets are replaced by theoretical assets, the integration between the financial and real assets is realized. KEWT 6.12 data-sets are theoretically endogenous and hold at the endogenous-equilibrium. Market actual data and estimated data at the financial assets are now compared with corresponding endogenous data. For example, the ten year debt yield is compared with the rate of return in equilibrium by sector. The cost of capital, as the rate of return less growth rate of dividends or output, is intuitively given in the financial

[3] Kamiryo, H. (2010) first proved the existence of the neutrality using KEWT 3.09 for 58 countries by sector; 1990-2007. The author here points out two weak points to the neutrality in the use of KEWT 3.09: (1) the conditions to the endogenous-equilibrium are not so much strict as KEWT 6.12, since the rate of unemployment was used as the last means to maintain equilibrium and (2) the data-sets do not include the severe financial crisis after 2007. The author proves a fact that the neutrality under full-employment was attacked by financial crisis shock, using KEWT 6.12 for 81 countries by sector, 1990-2010, in Chapter 5.

market. The growth rates are estimated using econometrics, but it is not wholly endogenous. Theoretical or endogenous implies that every data are consistent with all the other data by country, year, and over years, in a whole system and this is the endogenous system.

To solve the market 7% problem, this Chapter compares the market interest rate on the x axis with the endogenous rate of return at the government sector on the y axis. The author represents the external rate of interest by the ten year debt yield, $r_{M(DEBT,10yrs)}$.

The neutrality of the financial/market assets to the real assets is results of the endogenous system. It seems that one could easily get an answer to the break-even point of primary balance. But, it is difficult to answer this problem straightforward. This is because, technically, the denominator of the rate of return must not be *capital* but *debt*.

Paul De Grauwe's (225, 2005) equations are most useful to solve the market 7% problem. This is because market and estimated values/ratios are right now replaced by endogenous values/ratios, regardless of the existence of the neutrality of the financial assets to the real assets in equilibrium. Deficit is expressed as minus (or, surplus as plus) in the endogenous system. In Grauwe's equations, deficit is expressed as plus, where interest is added to deficit. Let the author confirm the ties between endogenous and exogenous equations.

Ties lying between the endogenous system' equations and Grauwe's (225, 2005) equations

1. Instead of *GDP*, endogenous income *Y* is used under the endogenous-equilibrium. Meade and Stone (1969) are now accurately able to measure *Y*=income=expenditures=output. *Y* is the sum of consumption and saving: *Y*=*C*+*S*. Net investment is saving less the balance of payments: $I = S - (S - I) = S - BOP$.
2. Instead of budget taxes, endogenous taxes are used, where endogenous taxes are equal to the endogenous sum of government consumption and saving and, government net investment is measured as government saving less deficit: $T_{AX} = Y_G = C_G + S_G$ and, $I_G = S_G - (S_G - I_G) = S_G - \Delta D$.
3. Grauwe's government spending is endogenously expressed as $C_G + I_G$. Grauwe's primary budget is surplus when $C_G + I_G - T_{AX} > 0$.
4. Instead of the growth rate of *GDP*, the endogenous growth rate of *Y* is measured directly from the endogenous rate of technological progress, where the endogenous Phelps coefficient, $\alpha/(i \cdot \beta^*)$ works between the rate of return and the growth rate of *Y*: $r_0 = r^* = (\alpha/i \cdot \beta^*)g_Y^*$.
5. The above values are each expressed as a corresponding ratio, i.e., dividing each value by output. For example, $bop = BOP/Y$, $\Delta d = \Delta D/Y$, $s = S/Y$, and $i = I/Y$. Further, in the endogenous-equilibrium, the rate of return by sector is measured using each sector's output, capital, and seven parameters. For example, $i_G = I_G/Y_G$ and $i_{PRI} = I_{PRI}/Y_{PRI}$.

6. Turning to the market 7% problem, the market interest rate to debt should be compared with the endogenous rate of return to debt, $r_G^* = \Pi_G / K_G$. The $r_G^* = \Pi_G / K_G$ is the product of Δd_K and $\Pi_G / \Delta D$, where $\Delta d_K \equiv \Delta D / K_G$. This product is a key for formulating the break-even point of primary balance. $\Delta d_K \equiv \Delta D / K_G$, is directly connected with primary balance; $\Delta d_K = \frac{\Delta D}{Y} \cdot \frac{Y}{Y_G} \cdot \frac{Y_G}{K_G} = \Delta d / (t_{AX} \cdot \Omega_G^*)$, where deficit $\Delta d = \Delta D / Y$, the government capital-output ratio, $\Omega_{0(G)} = \Omega_G^* = K_G / Y_G$. Y_G / Y is endogenously equal to $t_{AX} = T_{AX} / Y$, as the size of government.
7. The primary balance is defined as a deficit after reducing interest paid. It is logical that the primary balance is expressed by the product of Δd_K and $1 - r_{M(DEBT,10yrs)}$, in the current year. This is because the market rate is usually higher than the endogenous one and, investors are able to foresee the risk of debt by country.

4.3 Preliminary Discussion on Primary Balance: Market v.s. Endogenous

Before focusing on a few useful results and rules and interpreting the market 7% problem, this section empirically summarizes theoretical relationships between financial/market and endogenous ratios. Some of market-oriented results differ from endogenous results. Let the author explain the differences between market and endogenous results possibly using the case of the total economy as a weighted aggregation of an economy.

<u>For market results</u>

1. The relationship between the market interest rate to debt and the growth rate of *GDP* is not specified. Financial policy influences the market interest rate to debt, together with central bank policy, yet not using the real assets.
2. When deficits and debts increase, the financial market intuitively reflects a higher risk of bankruptcy. For example; Credit Default Swap (ODS) reflects the situation intuitively.

<u>For endogenous results</u>

3. The relationship between the rate of return and the growth rate of output is determined by the endogenous Phelps coefficient,[4] $r_0 = r^* = (\alpha / i \cdot \beta^*) g_Y^*$, as pointed out

[4] The difference between exogenous Phelps and endogenous Phelps is: Phelps, E. S. (145, 1966) distinguishes the golden age to maximize consumption with the golden rule to investment, while the endogenous Phelps in the endogenous system maximizes the rate of return with minimum net investment under a given consumption, $C = C_G + C_{PRI}$, where national taste/preferences is calculated as macro utility by country, using the relative discount rates of capital goods to consumer goods; $(rho/r)(C/Y)$, the

above. It implies that if the relative share of capital, *alpha*, equals the product of the quantitative net investment coefficient, *beta**, and the ratio of net investment to output, $i = I/Y$, then, $r^* = g_Y^*$ is realized in equilibrium. And thus, the cost f capital turns to an immeasurable zero.

4. When a deficit reaches zero, the endogenous rate of return and accordingly, the growth rate of output become a maximum, with a minimum net investment, under a constant *beta** assumption. Endogenous results of the total economy are exclusively equal to those of the private sector. This corresponds with an exogenous textbook case in the literature.
5. In the government sector, when deficits and debts increase, its rate of return turns to minus: the more minus the government saving the more minus the government rate of return in equilibrium and accordingly, the government share of capital. When government saving becomes minus (as in Japan, after 1991), the equilibrium condition becomes severe by year.
6. When the rate of technological progress stays at above zero, the growth rate of output remains above zero. This fact does not contradict the endogenous Phelps coefficient. A plus growth rate under a minus rate of return and a minus relative share of capital (i.e., $+= - \cdot -$) is traced back to a rule that $i = I/Y$ must be above zero by sector in the endogenous-equilibrium.

For market and endogenous results

7. The market rate cannot specify the rate of inflation or deflation, while endogenously, the rate of inflation or deflation[5] is involved in the hyperbola reduction of the rate of return equation. The endogenous rate of inflation/deflation is the horizontal asymptote less the rate of return in equilibrium, setting $i = I/Y$ on the x axis.

For simplicity, this paper does not discuss the liquidation of debt, except for this paragraph. Reinhart, C. M. and Sbrancia, M. B. (NBER WP# 16893, 64p., 2011), based on Reinhart, C. M. (NEER WP#15815, 127p., 2010), empirically proves that national debts reduce not only by default but also by debt issue at an arbitrary interest rate, less than the market debt yield. Conclusively, the liquidation of debt remains one of symptomatic treatments and countermeasures. Default and financial institution-rescue shift money from government to enterprises, while liquidation of debt from enterprises to government. The author indicates that the liquidation of debt is measured by a minus cost of capital under deflation and that under such deflation, it is impossible for policy-makers to adjust the rate of inflation. According to the current European Central Bank (ECB) information, the current EU crisis realizes 53.5% reduction of debt at Greece rescue at the sacrifice of

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propensity to consume $c = C/Y$, and $\frac{rho}{r} = 13.301c^2 - 22.608c + 10.566$.

[5] The rate of deflation is measured endogenously, apart from the viewpoint of macro demand and supply differences under the price-equilibrium and using the reduced hyperbola of the rate of return to the ratio of net investment to output by sector.

investors. These show a possibility that government, enterprises, and financial institutions are all able to realize a win-win relationship, without bubbles-repeating. The possibility is guaranteed by policy-makers' execution that realizes actual data closer to endogenous data by year.

Compulsive reduction of deficit is one policy. Plus net investment at a minimum level is another policy. Both policies aim at the same goal that guarantees sustainable growth and returns. However, if area countries all understand a minimum plus net investment by country and year, the rate of technological progress will recover steadily by country and, this is an essential real-oriented policy. Real-oriented policy may or may not become against a bold reduction of debt through default and against a steady liquidation of debt.

4.4 Rules and a Variety of Results by Country to Show up the Market 7% Problem, 1990-2010

This section first explains two tables that show the whole background spread in the real assets. The background is condensed by the neutrality of the financial assets to the real assets, endogenously including the exchange rate by country. Second, this section finds a few logics/rules derived from the results of empirical analyses, using (1) panel and cross section figures by area and (2) time series figures by country. The purpose to find a few logics is to confirm how the break-even point of primary balance differs definitely by country, although common logics prevail behind. Real-oriented policies are required for stabilizing economic society tossing with the market 7% problem.

First, **Tables 1, 2**, and **3** by weighted average area (see, before References) each show the neutrality of the financial assets to the real assets by using money supply, ten year debt yield, and the US exchange rate (hereunder, the neutrality). In detail, some countries are most neutrality-oriented over years while others are often fluctuating, depending on the whole policies by country over years. If the endogenous-equilibrium shows moderate, the neutrality is guaranteed strictly. When the endogenous-equilibrium falls into close-to-disequilibrium or disequilibrium, the neutrality is numerically fluctuating, sharply out of order. The more developed the economy, the more stable the economy is. The more developing the economy, the more unstable the economy often is. It is a prominent fact among 81 countries that Euro currency area realizes the neutrality much more steadily than other areas; other Europe area, Asian & Pacific, and Rest area (Latin America and Africa). The above figures prove that the Euro area average has partially enjoyed its integrated economic system although disorder attacked the neutrality after bubbles[6],

[6] Reinhart, C. M., and Rogoff, K. S. (346, 2011) uses 5-year moving average for domestic debt and default. KEWT does not need moving average by item and/or element since KEWT is thoroughly policy-oriented. For business cycle analysis, however, the author finds that 3-year moving average makes the trend

similarly to other areas.

Second, **BOX 4-2** and **4-3** by area each show the panel of 46=17+14+15 countries (excluding 3 area averages) by the corresponding cross section figures. The LHS of each figure compares the market rate to debt, $r_{M(DEBT,10yrs)}$, on the x axis with the endogenous rate of return at the government sector, $r_G^* = \Pi_G / K_G$, on the y axis. The RHS of each figure compares government deficit/government capital, $\Delta d_K \equiv \Delta D / K_G$, with government returns to deficit, $\Pi_G / \Delta D$. The ΔD here shows 'primary balance' after reducing interest paid or after dividing deficit D by $\left(1 - r_{M(DEBT,10yrs)}\right)$. The difference between before and after reducing interest paid is just expressed by using $\left(1 - r_{M(DEBT,10yrs)}\right)$. The higher the 10 year debt yield the lower the primary balance is and, vice versa.

The denominator of Δd_K is government capital, K_G, instead of output, Y, so that $\Delta d_K \equiv \Delta D / K_G$ directly corresponds with the market 10 year debt yield. Exactly, the denominator of Δd_K turns from Y to K_G, by multiplying the product of the government capital-output ratio and the endogenous taxes/output. A problem is that the market debt yield is above zero by country. It implies that the hyperbola equations do not regularly work if this restriction is set.

BOX 4-2 by country remains at the 1st where a hyperbolic curve at the1st quadrant only slips down to the 4th quadrant. **BOX 4-3** by area average exactly shows two hyperbolic curves at the 1st and 3rd quadrants, without exception. It implies that the negatively higher the deficit the less net investment-oriented the economy is. This is in reality and empirically proved by country. It implies that under a minus net investment an economy cannot maintain sustainable growth. Many countries have incidentally taken this policy, facing at disequilibrium or close-to-disequilibrium. After bubbles, two choices, sustainable or further aggravating, economically separate robust countries with weak countries, with no exception among 81 countries. Net investment policy by sector is important much more than any others for steady maintenance of growth and returns by country. The break-even point[7] of primary balance in budgeting remains one of resultant phenomena by country. To confirm the above results, **BOX 4-4**, **4-5**, and **4-6** by country are shown. These figures each follow the same results as BOX 4-2 and 4-3.

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moderate and smoothly shows net investment business cycle at the private sector, as shown in Chapter 14.

[7] For the author's hyperbolic break–even points wholly for flows and assets, see "Accounting" edited by Japan Accounting Association: 1967, 958-968; 318-330; 1968, 649-668; and 1969, 827-846; 963-990.

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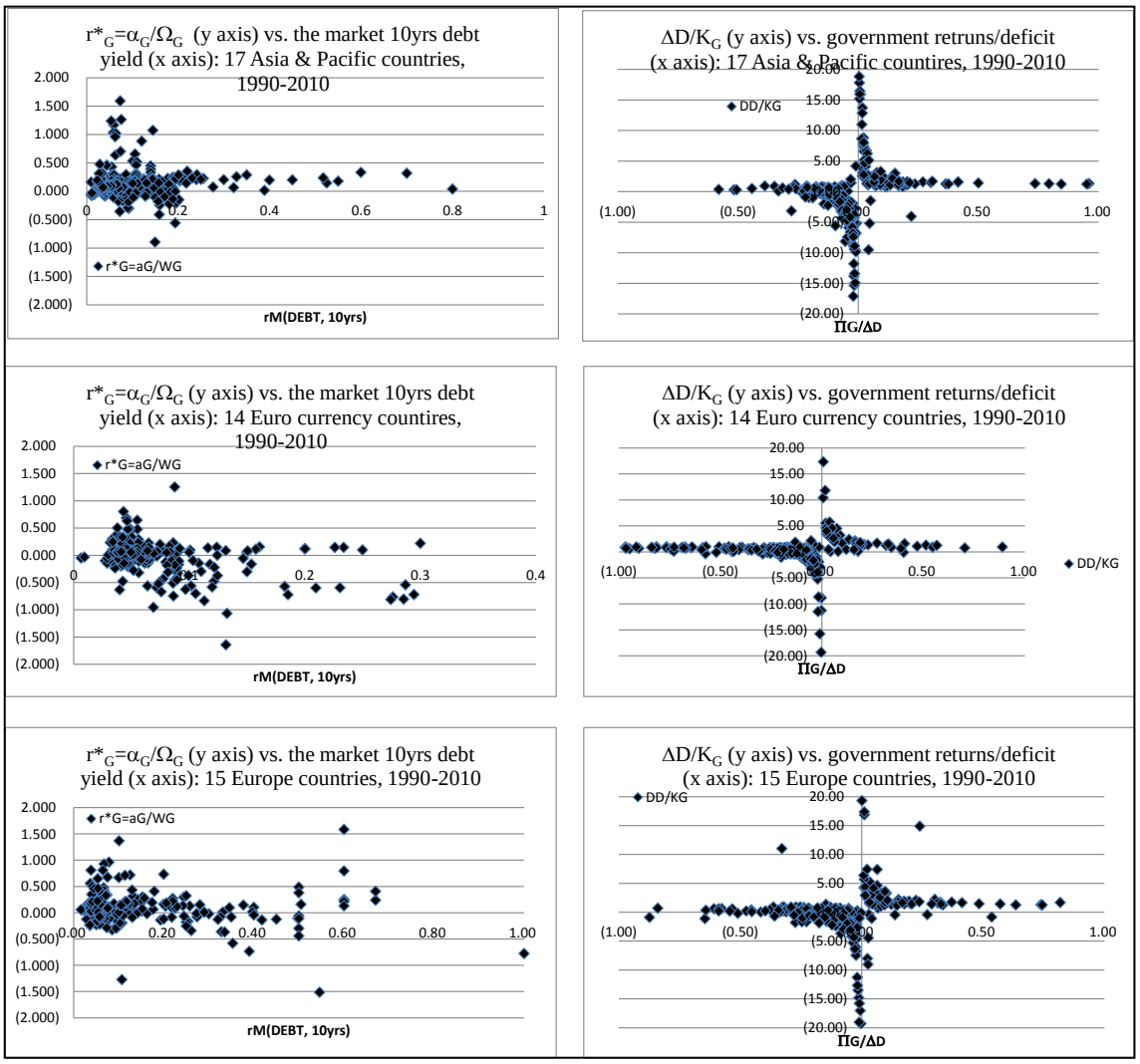
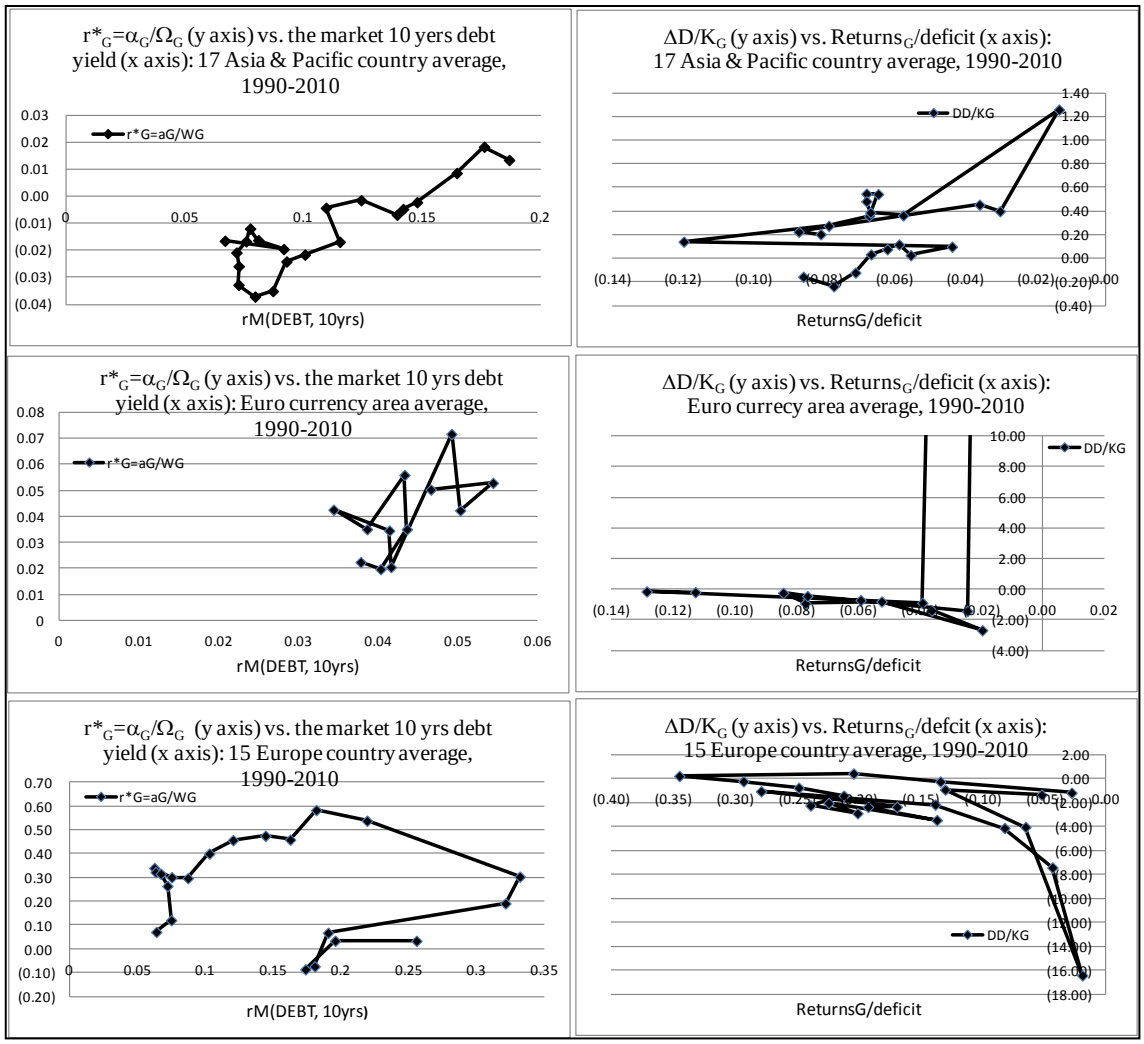
BOX 4-2 Market debt yield to the endogenous rate of return at the government sector (LHS) and the deficit/government capital stock to the government returns/deficit (RHS), panel by area



Data source: KEWT 6.12-1 to -3, by country and sector, 1990-2010, whose original data are from *International Financial Statistics Yearbook*, IMF

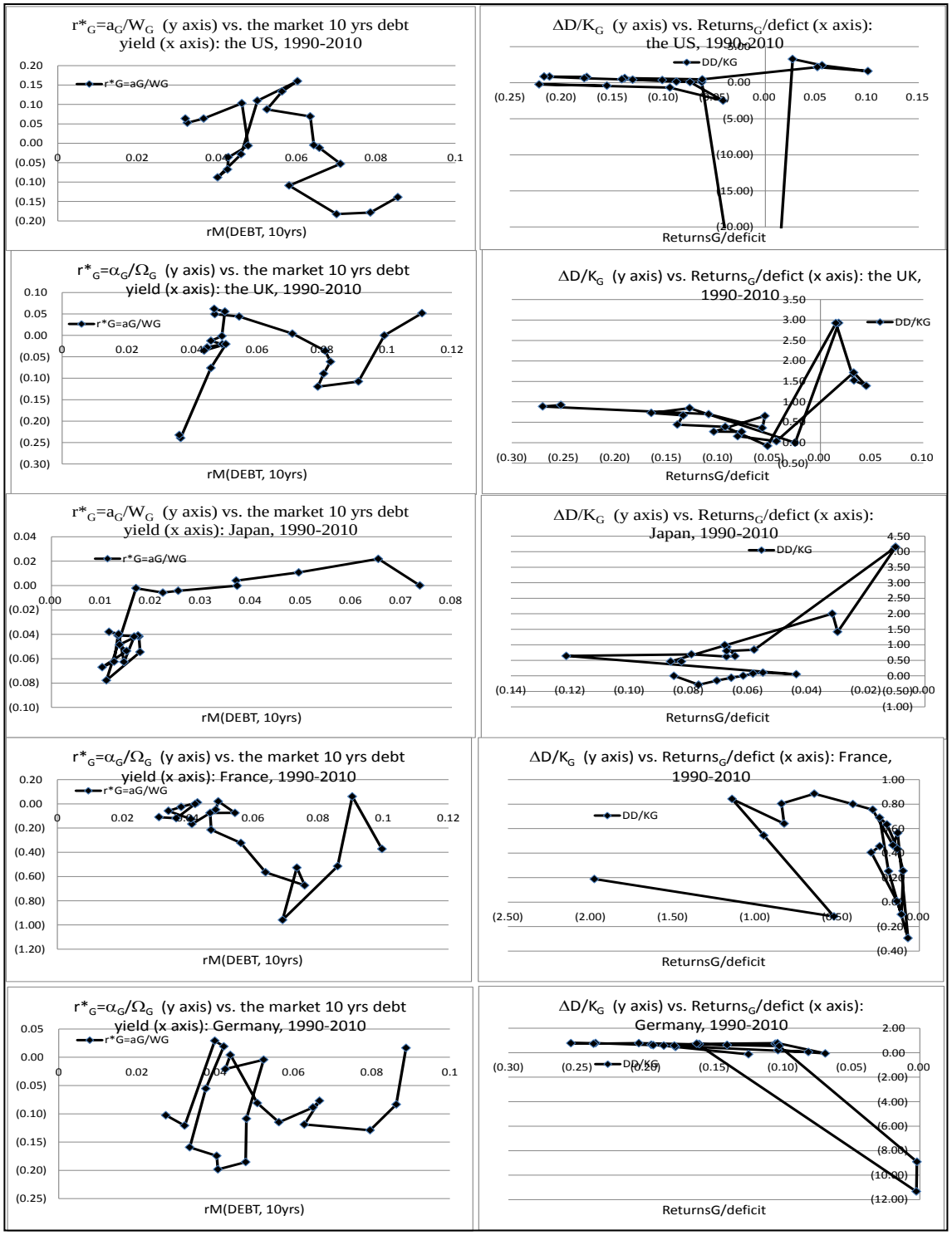
BOX 4-3 Market debt yield to the endogenous rate of return at the government sector (LHS) and the deficit/government capital stock to the government returns/deficit (RHS), average by area



Data source: KEWT 6.12-1 to -3, by country and sector, 1990-2010, whose original data are from *International Financial Statistics Yearbook*, IMF

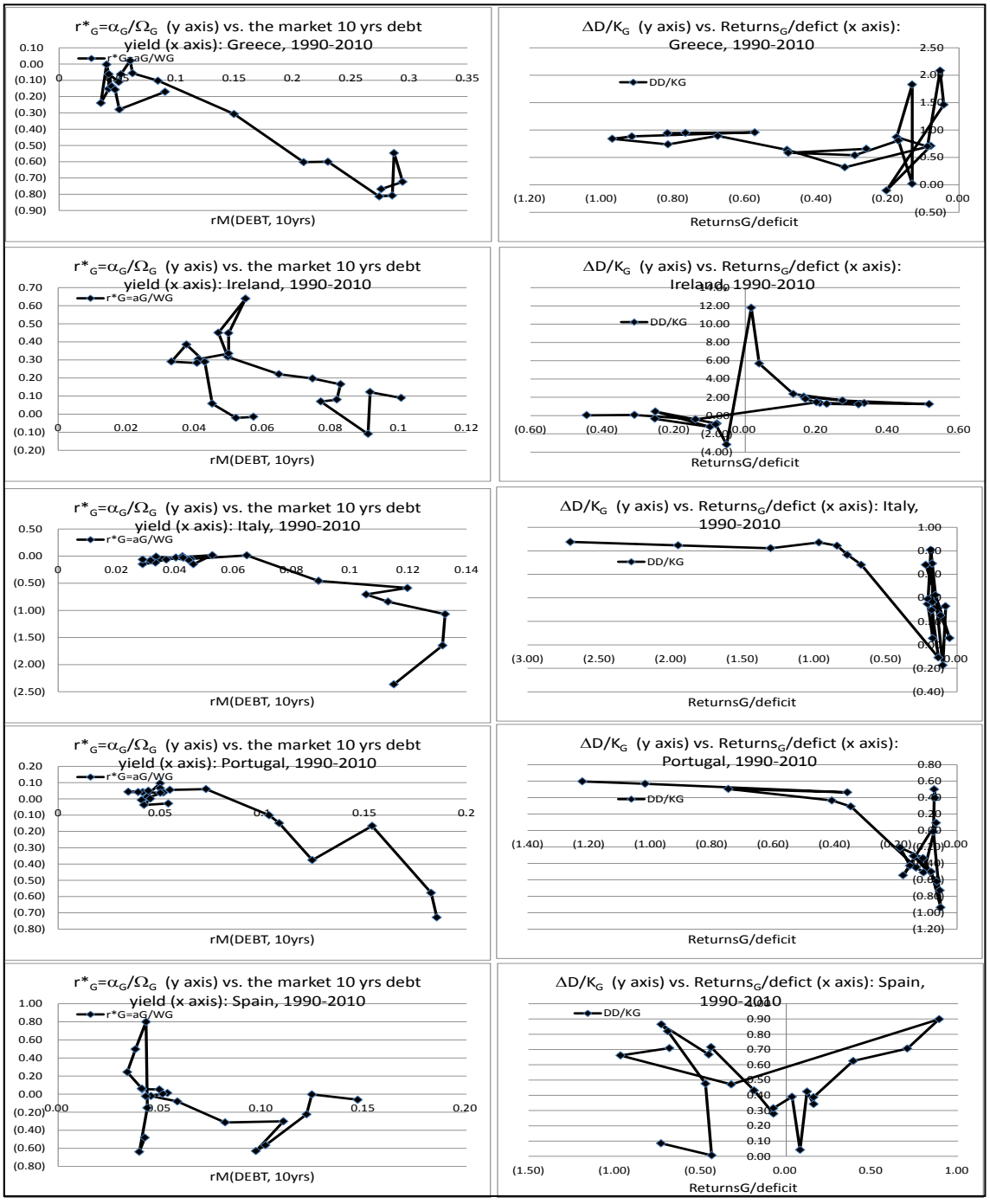
Note: Euro area is much more stable compared with the two other areas. The results within the government sector is much more fluctuating than those at the total economy and the private sector.

BOX 4-4 Market debt yield to the endogenous rate of return at the government sector (LHS) and the deficit/government capital stock to the government returns/deficit (RHS), by country (1)



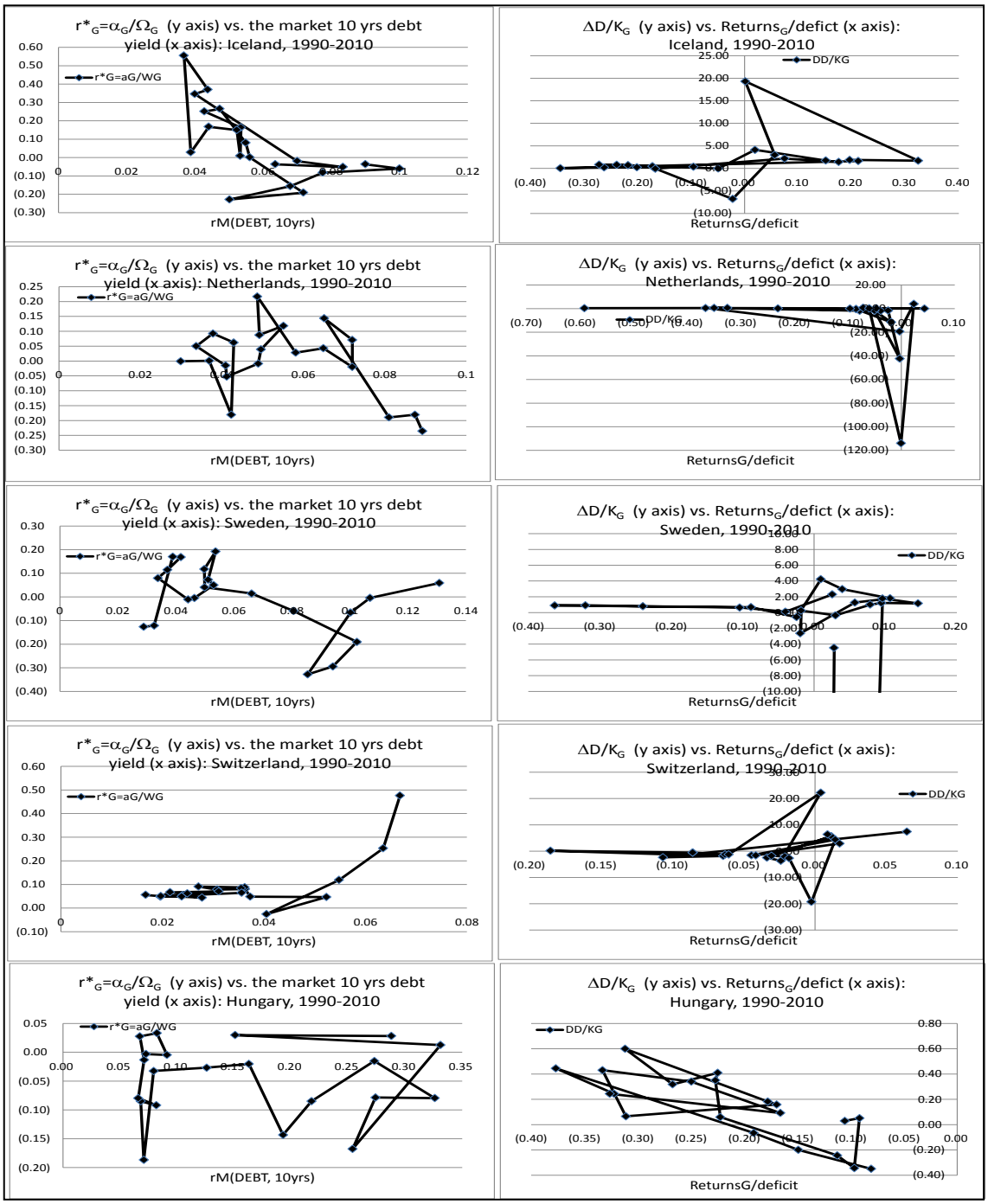
Data source: KEWT 6.12-1 by country and sector, 1990-2010, whose original data are from *International Financial Statistics Yearbook*, IMF

BOX 4-5 Market debt yield to the endogenous rate of return at the government sector (LHS) and the deficit/government capital stock to the government returns/deficit (RHS), by country (2)



Data source: KEWT 6.12-1 by country and sector, 1990-2010, whose original data are from *International Financial Statistics Yearbook*, IMF

BOX 4-6 Market debt yield to the endogenous rate of return at the government sector (LHS) and the deficit/government capital stock to the government returns/deficit (RHS), by country (3)



Data source: KEWT 6.12-1 by country and sector, 1990-2010, whose original data are from *International Financial Statistics Yearbook*, IMF.

First, on the LHS of each figure, the shape of time-series differs by country. Some countries spread widely while others narrowly. The market interest rate/yield does not basically show minus yet, the rate of return in the government sector in equilibrium spreads widely due to the change in deficit over years. The shape by country basically reflects its fiscal policy by year. The shape is also influenced by financial market policies by country. This is because fiscal policy and the financial/market policies are closely related and actual data are within a certain range of endogenous range by country.

For confirmation, let us look at time series figures by country. These figures are drawn using basic endogenous equations (for equations, see *Notations* at the beginning of Monograph). The tendency of the market 10 year debt yield does not far from that of the rate of return at the government sector in equilibrium. It implies that the market shows the results sensitively to some extent, even though market results are intuitive. When policy-makers by country are unable to control four structural ratios (the qualitative net investment coefficient, the relative share of capital, the capital-output ratio, and the rate of return), the shape turns to abnormal. However, this sudden change does not indicate that the country will fall into default or bankrupted. Rather, by this sharp adjustment, the shape recovers soon later. Many countries have recovered with these sharp adjustments or shocks. The market warns ahead the current situation by country. The short-term market rates fluctuate sometimes sensitively, but this comes from money-oriented decision-making to react against risky conditions, although risky conditions are unknown except for endogenous data such as four structural ratios.

Second, on the RHS of each figure, the shape further differs by country. This is because net investment and its accumulation or capital stock are dynamically influenced by equilibrium conditions by country. Nevertheless, some common shape is observed when government returns are extremely minus: the higher negatively government returns the less net investment. This fact is not compulsive but due to policies by country and within the selfish balance between votes and democracy. The author indicates that this fact naturally comes from the logics/rules of the endogenous-equilibrium. When policy-makers are brave or selfish beyond a limit, the reaction backs to themselves. And, the results finally turn back to people. Policy-makers, leaders, and people know and accumulate the results through learning by doing. Developing countries are usually brave partly due to the fact that infrastructures are a necessary priority and the private sector gets its benefit by inducing foreign direct investment steadily. Some developed counties, however, invest in over-infrastructures and spend subdivides as minus taxes beyond each limit. The private sector, as a result, does not appropriately get benefits and fall into crowing out, as in Japan.

Fiscal, financial and market policies by year determines the balance of payments, deficit, and the difference between net saving and net investment in the private sector. There is mild plus and minus limits to the balance of payments by country while the real assets realize maximum returns solely under a minimum net investment and surplus=

deficit=0. Therefore, the shapes in figures by country have a variety of observations. The rules are common yet shapes differ.

The market 7% problem thus cannot be formulated by country. The goal of the market 7% problem is to seek for moderate equilibrium by country and by sector, realizing dynamic balances between actual and endogenous data and also moderate balances between the government and private sector. This paper therefore advocates that the ratio of primary deficit after reducing interest paid cannot be generally specified or formulated.

4.5 Endogenous Conclusions

The author finds that a 7% deficit to *GDP* is empirically set with the market principle and it is not far from theoretical results. This chapter presents the necessary conditions underlying this issue. The financial/market assets show results not far from the results of the real assets. Then, why are bubbles repeated once or twice in a decade? This is not the responsibility of the financial/market assets and policy-makers. The reason is that there has not been any endogenous system to control all the parameters and variables by country, sector, and year, and over years or, in harmony with the space and time issue such that macro and micro physics and element chemistry today have conceived and partially proved. Endogenous data are most fitted for the proof of the space and time issue since money is homogenous magnitude, where a unique problem is greedy human decision-making. Equations of endogenous data are non-linear with each reduced hyperbola form. Linear econometrics is not applicable to endogenous equations. The current econometrics revives robustly by cooperating with endogenous data, where the initialization at a starting year has no given data and cut tautology.

Endogenous equations between deficits and debts by country solve the market 7% problem and reveal causes at the real assets. The answer to the market 7% problem indicates how to treat the equations between deficits and debts not to repeat bubbles and realize sustainable growth and returns by sector. The necessary conditions required for deficits and debts by country are determined by possible controllability using seven endogenous parameters derived from the discrete Cobb-Douglas production function (three items; the ratio of net investment to output, the rate of change in population, and the relative share of capital, and four items; the qualitative net investment coefficient, the relative share of capital, the capital-output ratio, and the speed year coefficient). And, four key structural ratios (the qualitative net investment coefficient, the relative share of capital, the capital-output ratio, and the rate of return) together express qualitative level of policy-control. More wholly, the necessary conditions required for deficits and debts must aim at dynamic balances between the government and private sectors, while setting actual data closer to endogenous data.

Chapter 4

Roadmap to fiscal policy: after empirical researches in Chapters 3 and 4 here, go to Chapters 12 and 13.

For readers' convenience: contents of tables and figures hereunder

Tables N1 to N3 Neutrality of the financial/market assets to the real assets by are and country.

Figures O1 to O10 The capital-output ratio, Ω^*, and the rate of return, r^*, 1990-2010, by area and country.

Table N1 Neutrality of the financial/market assets to the real assets in 17 country Asia & pacific weighted average area

cell#	IF	IG	IH	IT	IU	JB	JD	JE	JF	IV
Neutrality c	m_K=M/K	m=M/Y	m_Π=M/Π	$r_{(DEBT)}-r^*$	$r_{(DEBT)}/r^*$	$(e_{(US)}/gy^{**}$	r*-r*(US)	$e^*_{(US)}$	$e_{(US)}/e^*_{(US)}$	$e_{(US)}/y^{**}$
17 Asian counries					gy**=gy*/gy*(US)		$e^*_{(US)}=e_{(US)}+(r^*-r^*_{(US)})$			y**=y*/y*(US)
1990	0.4969	1.2369	5.423	0.0950	2.037	0.17	0.0179	1.381	0.9871	0.09
1991	0.4767	1.2069	5.141	0.0834	1.900	0.14	0.0254	1.366	0.9814	0.08
1992	0.4529	1.2115	6.977	0.0997	2.535	0.15	(0.0085)	1.202	1.0070	0.09
1993	0.4375	1.2227	9.030	0.0994	3.051	0.45	(0.0181)	1.102	1.0164	0.14
1994	0.4285	1.2296	10.341	0.1005	3.425	0.83	(0.0234)	1.207	1.0194	0.22
1995	0.4293	1.2438	11.383	0.1017	3.696	0.82	(0.0208)	1.293	1.0161	0.25
1996	0.4269	1.2683	12.348	0.0897	3.594	1.05	(0.0217)	1.231	1.0176	0.28
1997	0.4249	1.2781	11.322	0.0719	2.916	0.38	(0.0146)	1.087	1.0134	0.12
1998	0.4343	1.3757	14.786	0.0859	3.924	2.85	(0.0209)	1.146	1.0182	0.38
1999	0.4421	1.4343	15.323	0.0717	3.483	4.35	(0.0207)	0.984	1.0211	0.42
2000	0.4416	1.4305	15.474	0.0643	3.252	2.96	(0.0217)	0.909	1.0239	0.36
2001	0.4511	1.4982	15.640	0.0582	3.017	3.27	(0.0301)	0.851	1.0353	0.40
2002	0.4624	1.5718	15.248	0.0492	2.622	10.21	(0.0442)	1.004	1.0440	0.63
2003	0.4697	1.5977	15.745	0.0427	2.432	10.79	(0.0517)	1.211	1.0427	0.79
2004	0.4704	1.5647	16.664	0.0444	2.573	5.02	(0.0550)	1.307	1.0421	0.74
2005	0.4753	1.5770	16.751	0.0433	2.526	3.59	(0.0625)	1.117	1.0560	0.63
2006	0.4781	1.5635	16.859	0.0474	2.671	5.05	(0.0489)	1.268	1.0385	0.75
2007	0.4824	1.5414	16.524	0.0483	2.653	4.67	(0.0339)	1.438	1.0235	0.74
2008	0.4876	1.5676	16.889	0.0520	2.801	2.35	(0.0419)	1.350	1.0310	0.59
2009	0.4974	1.6339	17.520	0.0632	3.225	(0.52)	(0.0841)	1.356	1.0620	0.03
2010	0.5043	1.6256	15.624	0.0345	2.070	0.13	(0.0719)	1.264	1.0569	0.18

Data source: KEWT 6.12-1, by country and sector, 1990-2010, whose original data are from *International Financial Statistics Yearbook*, IMF.

Note: *e* is the exchange (per US$, ac), *M* is mostly M2, *K* is endogenous capital, $r_{(DEBT)}$ is 10 year debt yield, and growth rates and rates of return are each endogenously measured simultaneously by year and over years, 1990-2010.

Table N2 Neutrality of the financial/market assets to the real assets at Euro currency total area (in *IFSY*) weighted average

cell#	IF	IG	IH	IT	IU	JB	JD	JE	JF	IV
Neutrality c	m_K=M/K	m=M/Y	m_Π=M/Π	$r_{(DEBT)}-r^*$	$r_{(DEBT)}/r^*$	$(e_{(US)})/gy^{**}$	$r^*-r^*_{(US)}$	$e^*_{(US)}$	$e_{(US)}/e^*_{(US)}$	$e_{(US)}/y^{**}$
Euro Area in IFSY						$gy^{**}=gy^*/gy^*_{(US)}$		$e^*_{(US)}=e_{(US)}+(r^*-r^*_{(US)})$		$y^{**}=y^*/y^*_{(US)}$
1990										
1991										
1992										
1993										
1994										
1995										
1996										
1997										
1998										
1999	1.6735	0.7519	7.943	(0.1641)	0.2212	0.50	0.1611	1.1565	0.8607	2.17
2000	1.4332	0.7415	7.802	(0.1293)	0.2962	0.59	0.1334	1.2081	0.8896	2.64
2001	1.2996	0.7612	8.238	(0.1075)	0.3188	0.44	0.0989	1.2336	0.9199	2.78
2002	1.1128	0.7319	5.560	(0.1509)	0.2458	0.21	0.1256	1.0792	0.8836	2.42
2003	1.0507	0.8078	8.691	(0.0793)	0.3441	0.27	0.0394	0.8312	0.9526	3.18
2004	1.0046	0.8256	8.926	(0.0712)	0.3678	0.32	0.0293	0.7635	0.9616	4.83
2005	0.9911	0.8727	9.401	(0.0710)	0.3263	0.35	0.0145	0.8622	0.9832	8.81
2006	0.9758	0.9080	9.830	(0.0607)	0.3889	0.44	0.0220	0.7813	0.9718	104.91
2007	0.9521	0.9400	9.596	(0.0559)	0.4364	0.38	0.0362	0.7155	0.9495	0.00
2008	0.9246	0.9974	10.536	(0.0442)	0.4968	0.30	0.0170	0.7355	0.9769	0.22
2009	0.8727	1.0444	11.123	(0.0382)	0.5137	(0.09)	(0.0340)	0.6602	1.0516	0.03
2010	0.8297	1.0421	11.177	(0.0364)	0.5092	0.03	(0.0300)	0.7184	1.0417	0.31

Data source: KEWT 6.12-2, by country and sector, 1990-2010; Euro area original data are from *International Financial Statistics Yearbook*, IMF.

Note: *e* is the exchange (per US$, ac), *M* is mostly M2, *K* is endogenous capital, $r_{(DEBT)}$ is 10 year debt yield, and growth rates and rates of return are each endogenously measured simultaneously by year and over years, 1990-2010.

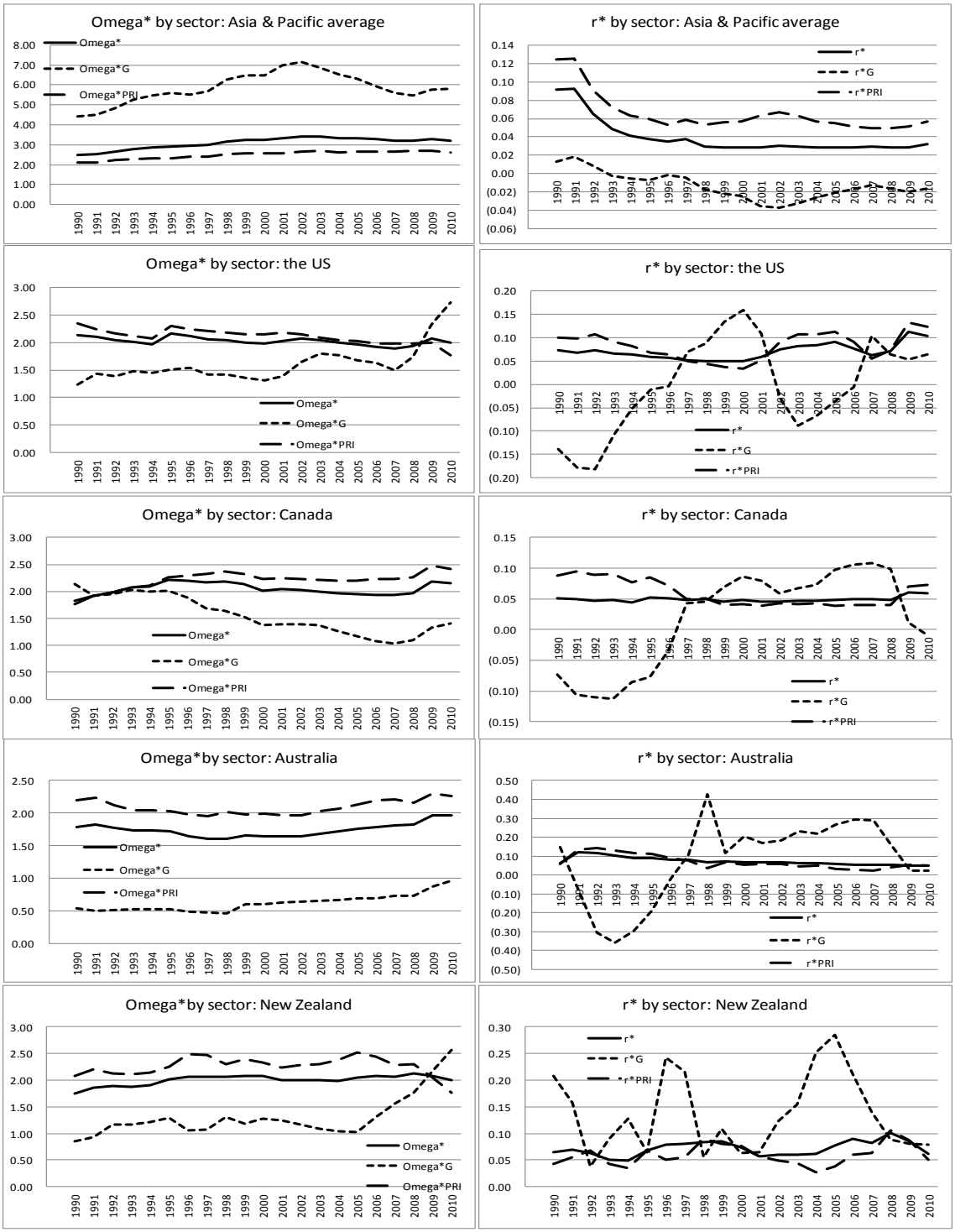
Chapter 4

Table N3 Neutrality of the financial/market assets to the real assets in 15 countries, except for Euro area, Europe weighted average area

cell#	IF	IG	IH	IT	IU	JB	JD	JE	JF	IV
Neutrality c	m_K=M/K	m=M/Y	m_{Π}=M/Π	$r_{(DEBT)}-r^*$	$r_{(DEBT)}/r^*$	$(e_{(US)})/gy^{**}$	$r^*-r^*_{(US)}$	$e^*_{(US)}$	$e_{(US)}/e^*_{(US)}$	$e_{(US)}/y^{**}$
15 Europe except for Euro Area						$gy^{**}=gy^*/gy^*_{(US)}$		$e^*_{(US)}=e_{(US)}+(r^*-r^*_{(US)})$		$y^{**}=y^*/y^*_{(US)}$
1990	0.7400	0.6902	7.446	0.1563	2.5726	38.25	0.0256	341	0.9999	########
1991	0.7688	0.6856	6.772	0.0822	1.7239	63.64	0.0462	581	0.9999	7313.70
1992	0.7694	0.6533	6.597	0.0571	1.4895	(43.67)	0.0433	874	1.0000	1126.34
1993	0.8006	0.6593	5.073	0.0228	1.1442	322.74	0.0913	1468	0.9999	3043.13
1994	1.0040	0.7206	6.824	0.0433	1.2944	(263.34)	0.0823	3893	1.0000	10933.55
1995	0.0672	0.0367	0.387	0.1479	1.8524	2.54	0.1149	17.6051	0.9935	6.01
1996	0.0705	0.0366	0.385	0.1488	1.8127	2.93	0.1269	19.6825	0.9936	5.16
1997	0.0824	0.0302	0.275	(0.0800)	0.7326	1.78	0.2470	23.5934	0.9895	1.54
1998	0.0782	0.0262	0.274	(0.1037)	0.6367	6.21	0.2352	25.2037	0.9907	2.20
1999	0.0713	0.0253	0.270	(0.1018)	0.6148	9.35	0.2147	28.8474	0.9926	2.17
2000	0.0690	0.0250	0.230	(0.1561)	0.4802	12.48	0.2500	32.2831	0.9923	1.90
2001	0.0573	0.0205	0.218	(0.1429)	0.4570	10.30	0.2042	33.2941	0.9939	1.35
2002	0.0562	0.0203	0.206	(0.1707)	0.3760	6.41	0.1990	27.5443	0.9928	0.80
2003	0.0570	0.0217	0.186	(0.2186)	0.2846	5.31	0.2240	25.0698	0.9911	0.61
2004	0.0541	0.0231	0.198	(0.1981)	0.2747	4.84	0.1899	21.9981	0.9914	0.51
2005	0.0712	0.0345	0.288	(0.1855)	0.2512	5.36	0.1568	24.7591	0.9937	0.55
2006	0.0669	0.0377	0.349	(0.1287)	0.3293	6.06	0.1146	23.2089	0.9951	0.53
2007	0.0663	0.0434	0.399	(0.0991)	0.4034	6.29	0.1030	20.7722	0.9950	0.47
2008	0.0637	0.0470	0.494	(0.0570)	0.5576	5.85	0.0581	26.5072	0.9978	0.54
2009	0.0573	0.0488	0.477	(0.0455)	0.6214	(2.35)	0.0077	26.6367	0.9997	0.04
2010	0.0579	0.0527	0.551	(0.0415)	0.6052	0.65	0.0010	27.4207	1.0000	0.48

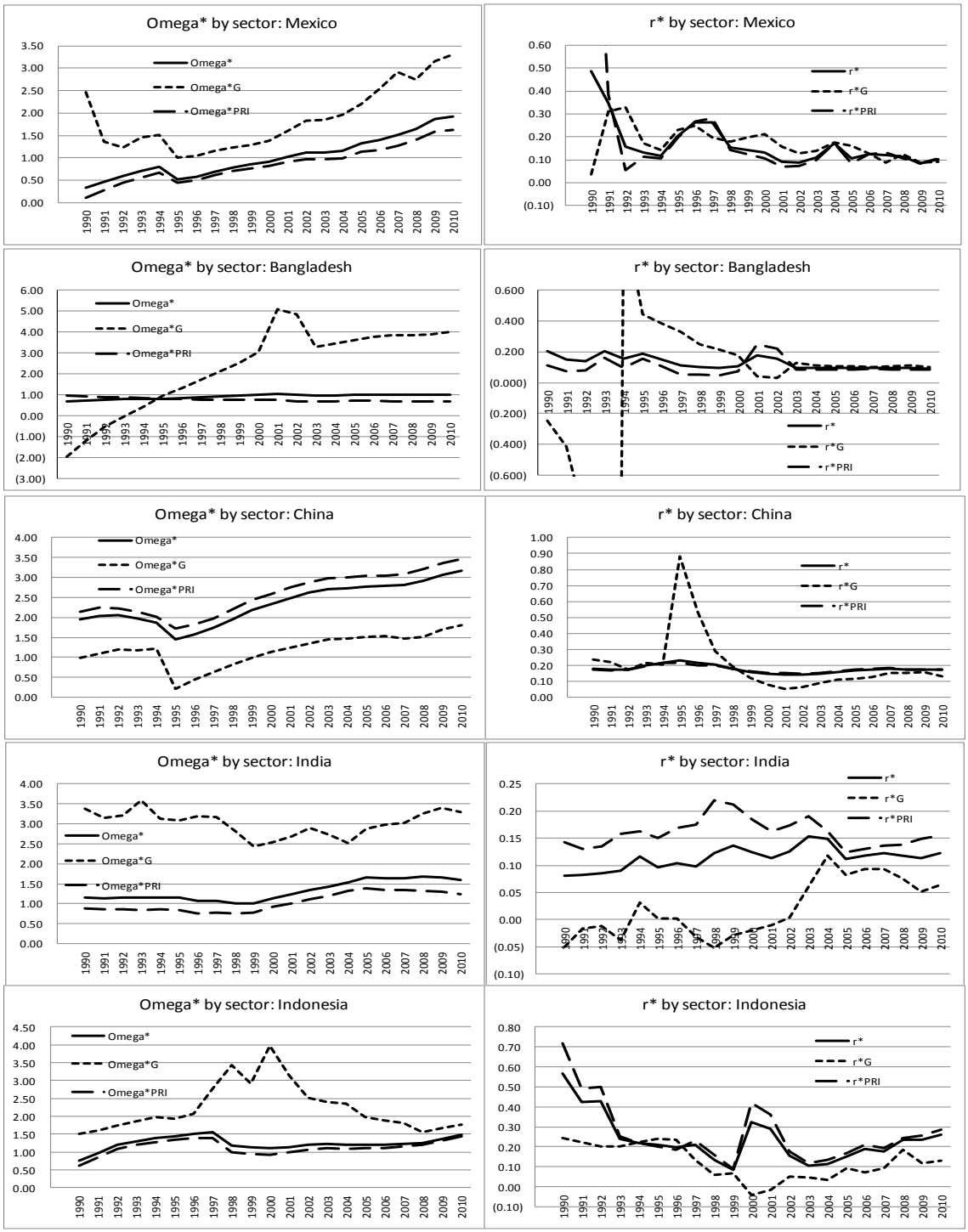
Data source: KEWT 6.12-3, by country and sector, 1990-2010, whose original data are from *International Financial Statistics Yearbook*, IMF.

Note: *e* is the exchange (per US$, ac), *M* is mostly M2, *K* is endogenous capital, $r_{(DEBT)}$ is 10 year debt yield, and growth rates and rates of return are each endogenously measured simultaneously by year and over years, 1990-2010.



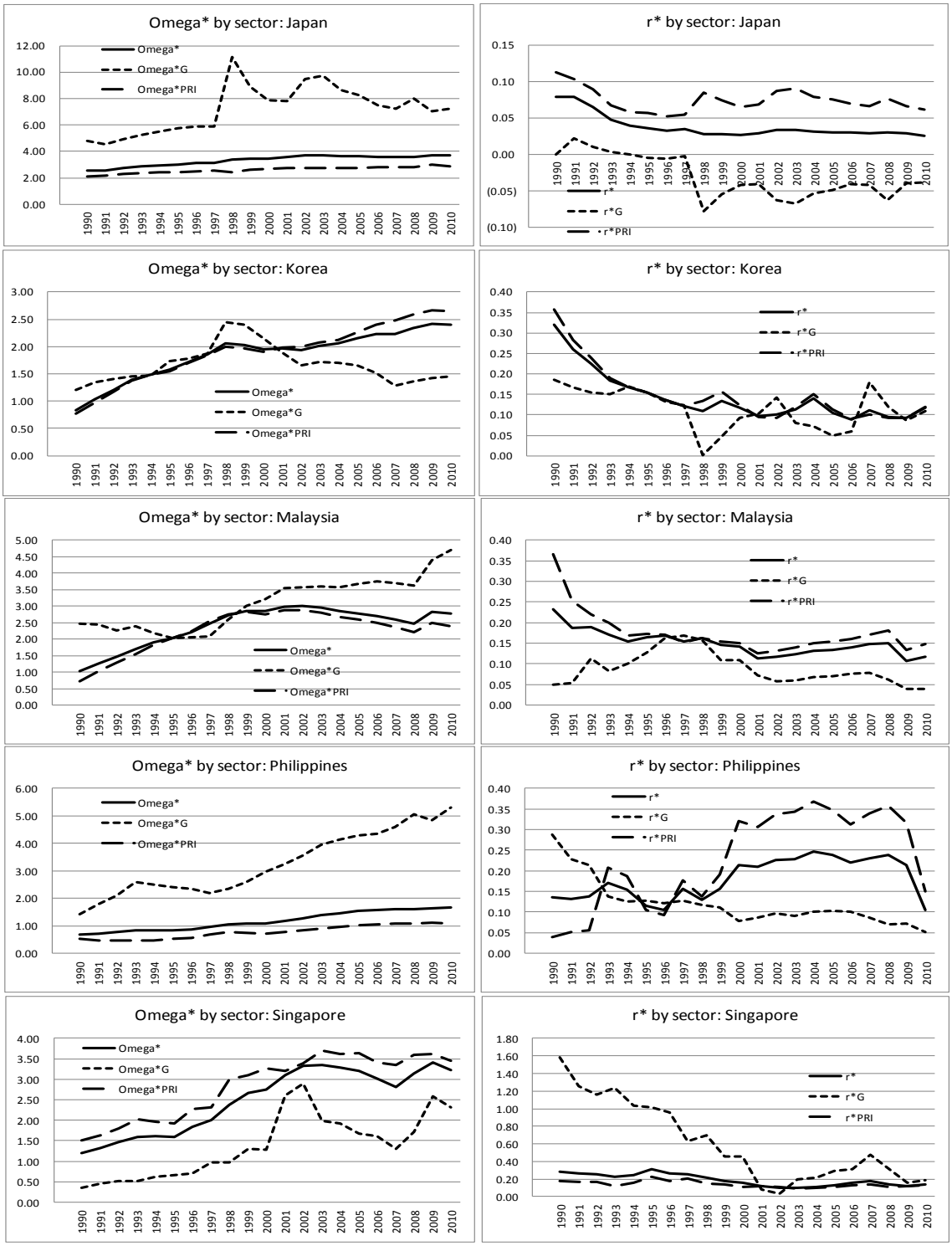
Data source: KEWT 6.12-1 to -3, by country and sector, 1990-2010, whose original data are from *International Financial Statistics Yearbook*, IMF.

Figure O1 The capital-output ratio, Ω^*, and the rate of return, r^*, 1990-2010: 17 country area average; the US; Canada; Australia; New Zealand



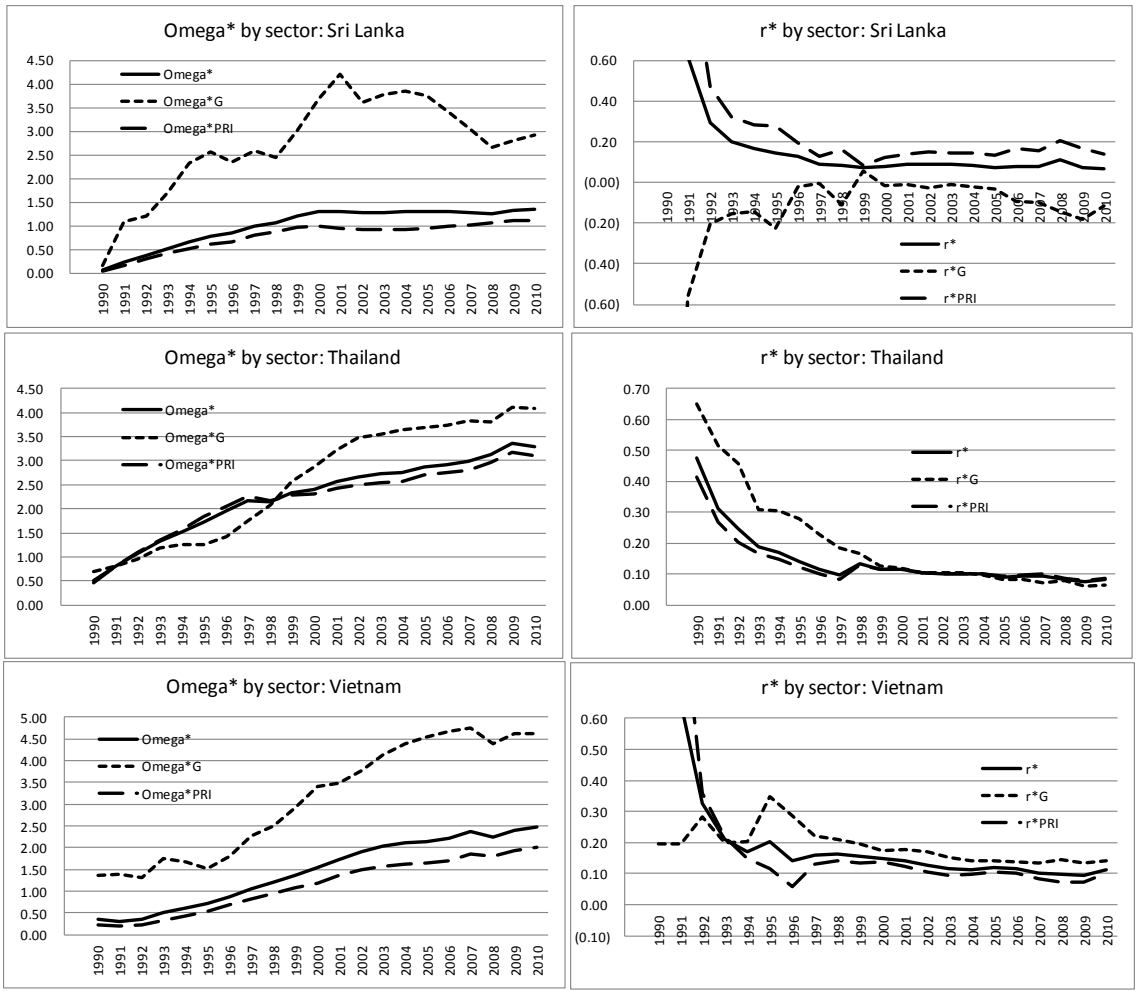
Data source: KEWT 6.12-1 to -3, by country and sector, 1990-2010, whose original data are from *International Financial Statistics Yearbook*, IMF.

Figure O2 The capital-output ratio, Ω^*, and the rate of return, r^*, 1990-2010: Mexico; Bangladesh; China; India; Indonesia



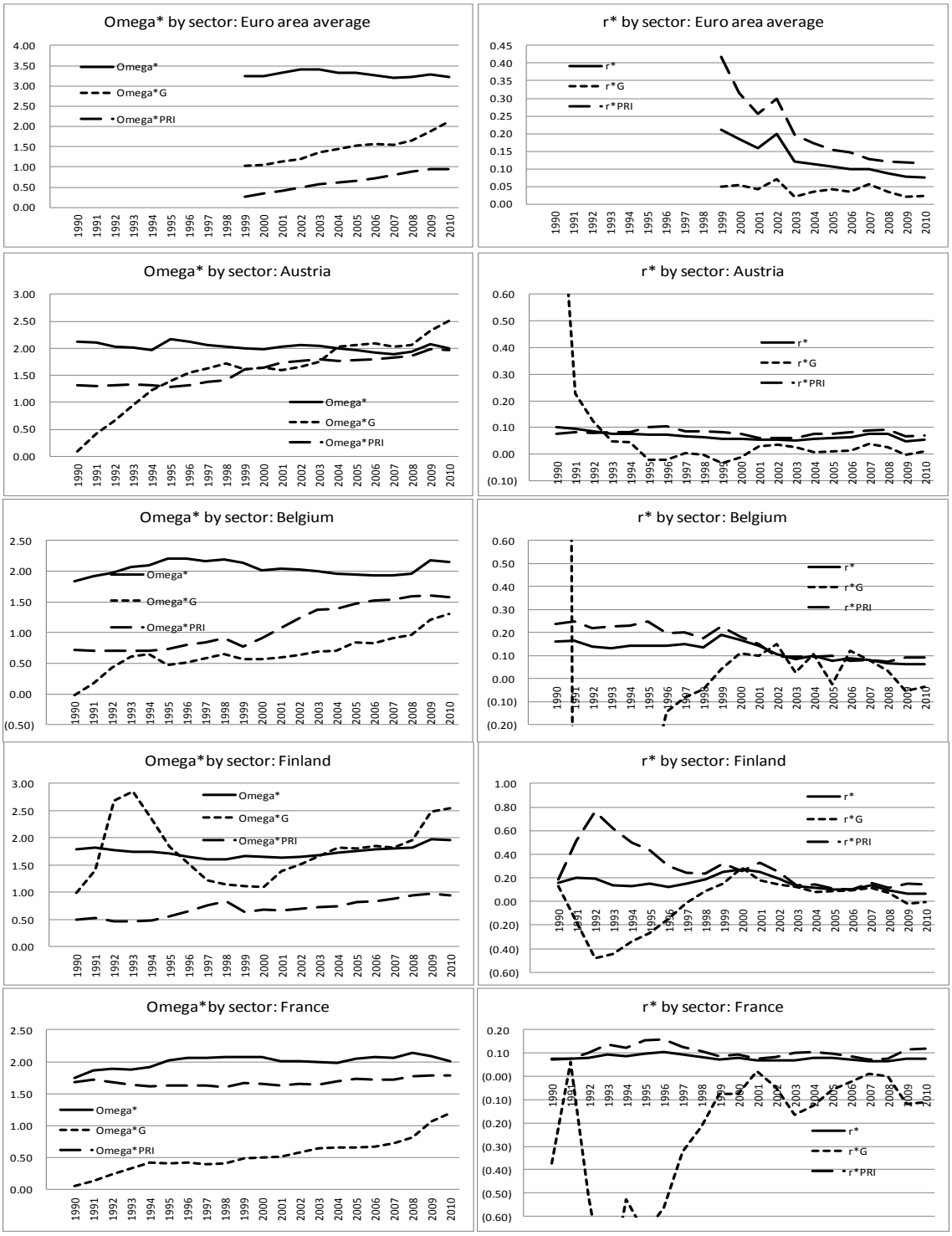
Data source: KEWT 6.12-1 to -3, by country and sector, 1990-2010, whose original data are from *International Financial Statistics Yearbook*, IMF.

Figure O3 The capital-output ratio, Ω^*, and the rate of return, r^*, 1990-2010: Japan; Korea; Malaysia; Philippines; Singapore



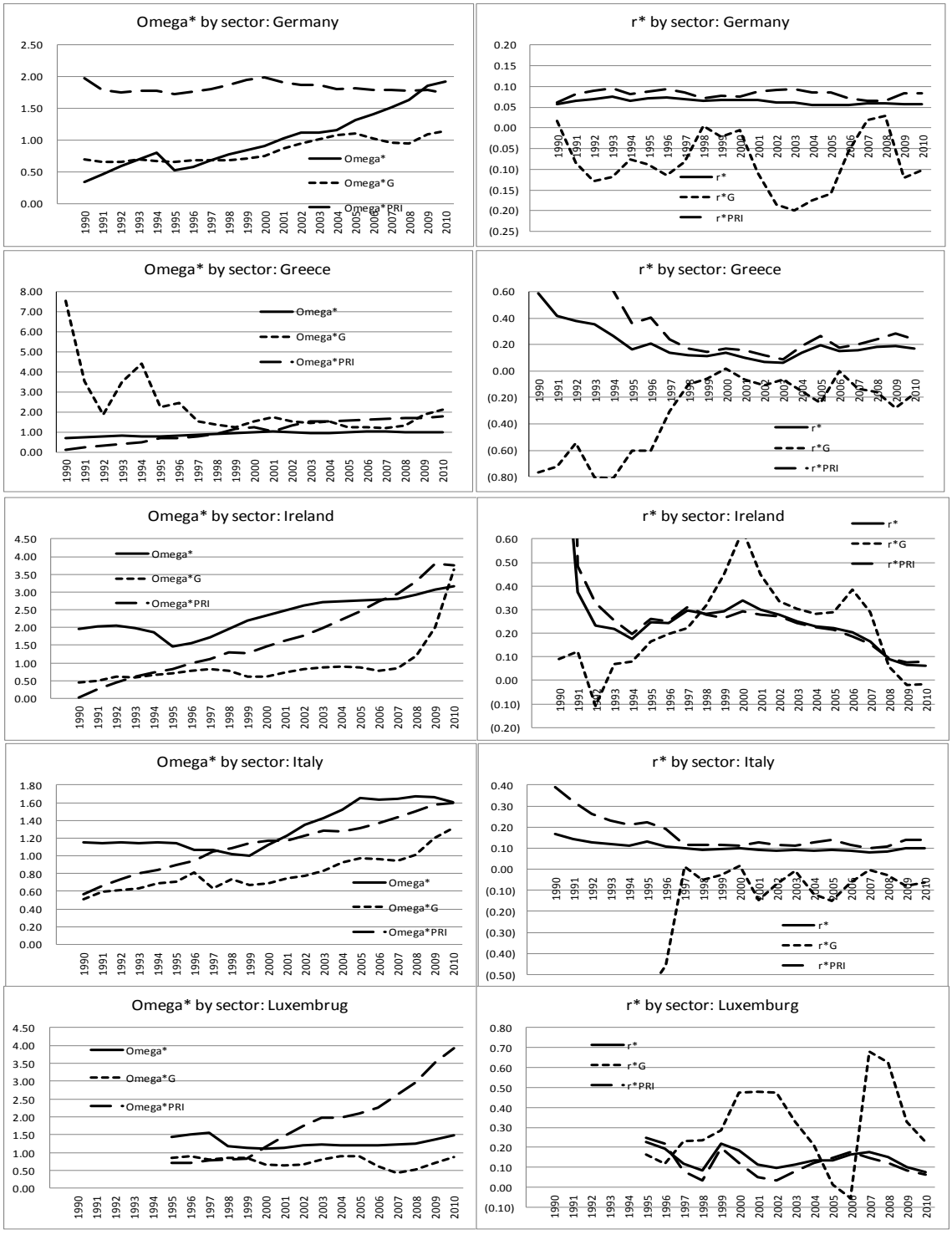
Data source: KEWT 6.12-1 to -3, by country and sector, 1990-2010, whose original data are from *International Financial Statistics Yearbook*, IMF.

Figure O4 The capital-output ratio, Ω^*, and the rate of return, r^*, 1990-2010: Sri Lanka; Thailand; Vietnam



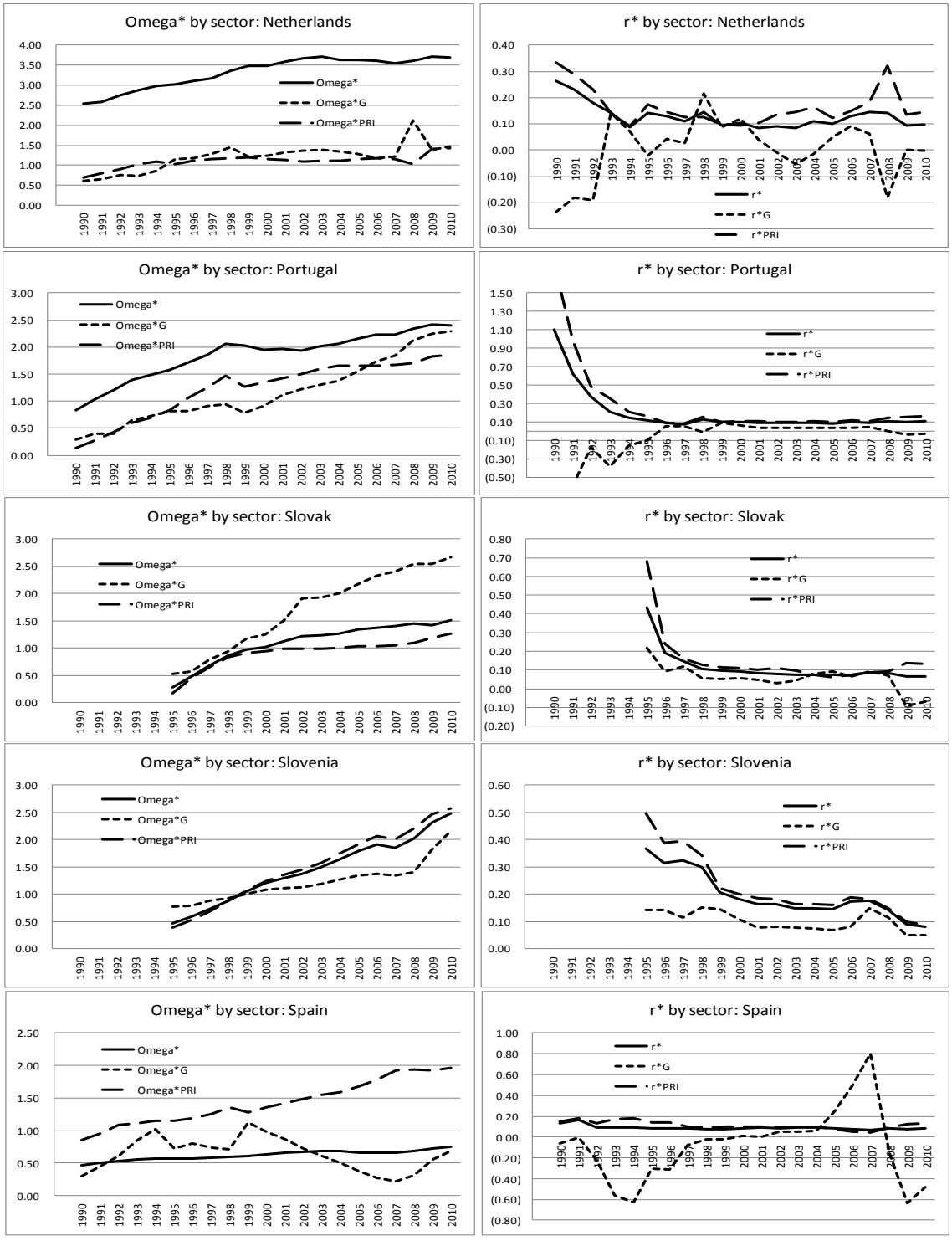
Data source: KEWT 6.12-1 to -3, by country and sector, 1990-2010, whose original data are from *International Financial Statistics Yearbook*, IMF.

Figure O5 The capital-output ratio, Ω^*, and the rate of return, r^*, 1990-2010: Euro area average; Austria; Belgium; Finland; France



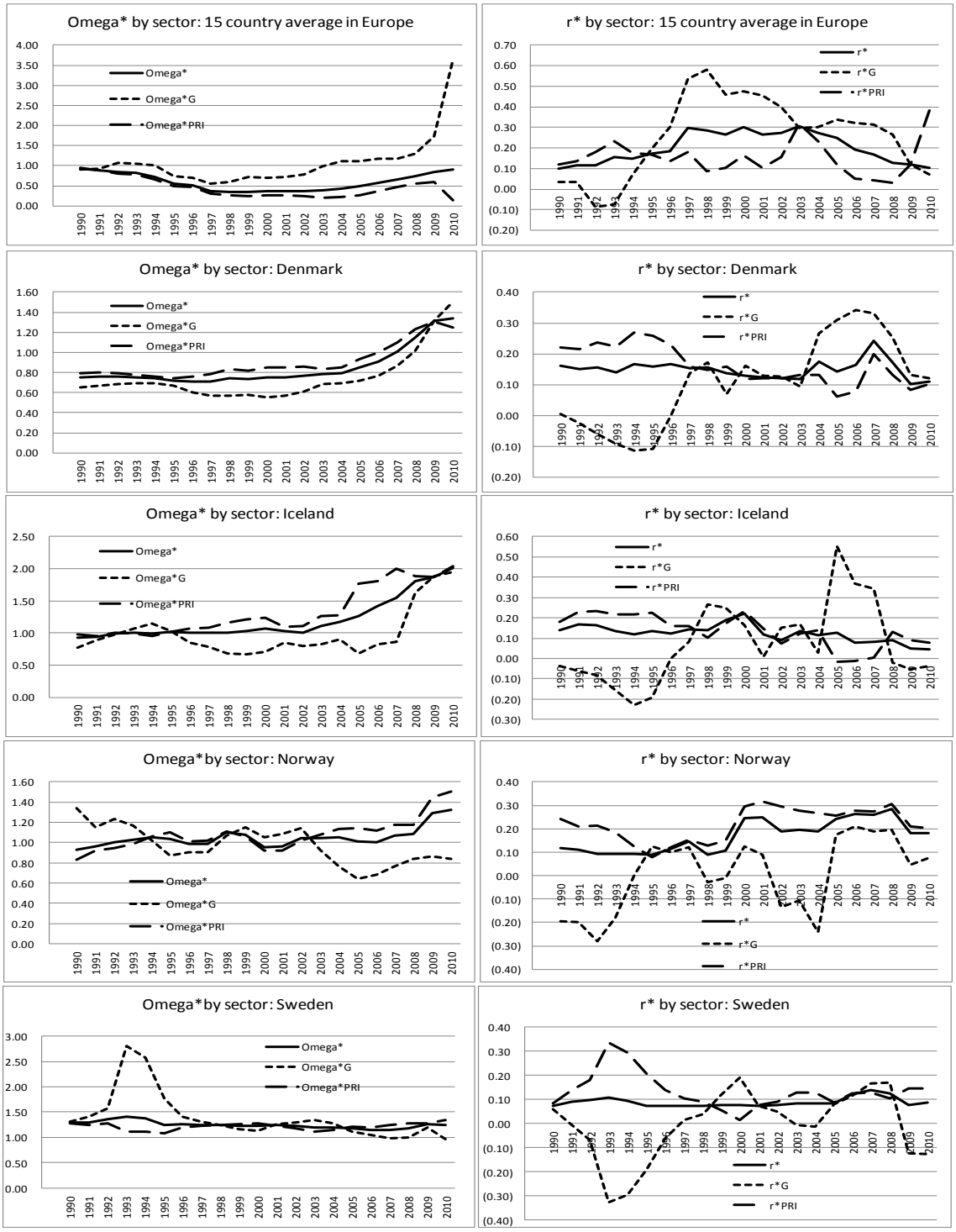
Data source: KEWT 6.12-1 to -3, by country and sector, 1990-2010, whose original data are from *International Financial Statistics Yearbook*, IMF.

Figure O6 The capital-output ratio, Ω^*, and the rate of return, r^*, 1990-2010: Germany; Greece; Ireland; Italy; Luxemburg



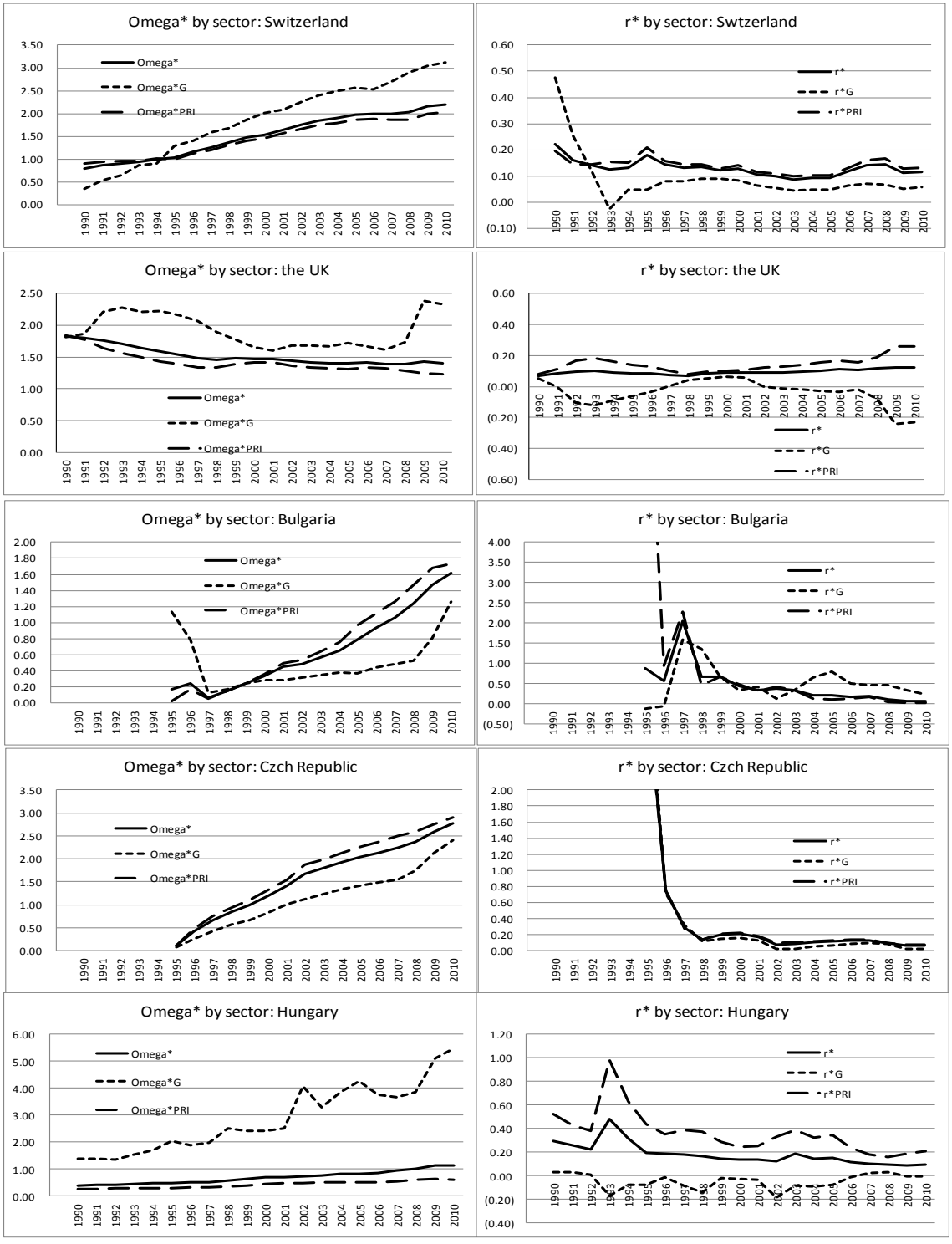
Data source: KEWT 6.12-1 to -3, by country and sector, 1990-2010, whose original data are from *International Financial Statistics Yearbook*, IMF.

Figure O7 The capital-output ratio, Ω^*, and the rate of return, r^*, 1990-2010: Netherlands; Portugal; Slovak; Slovenia; Spain



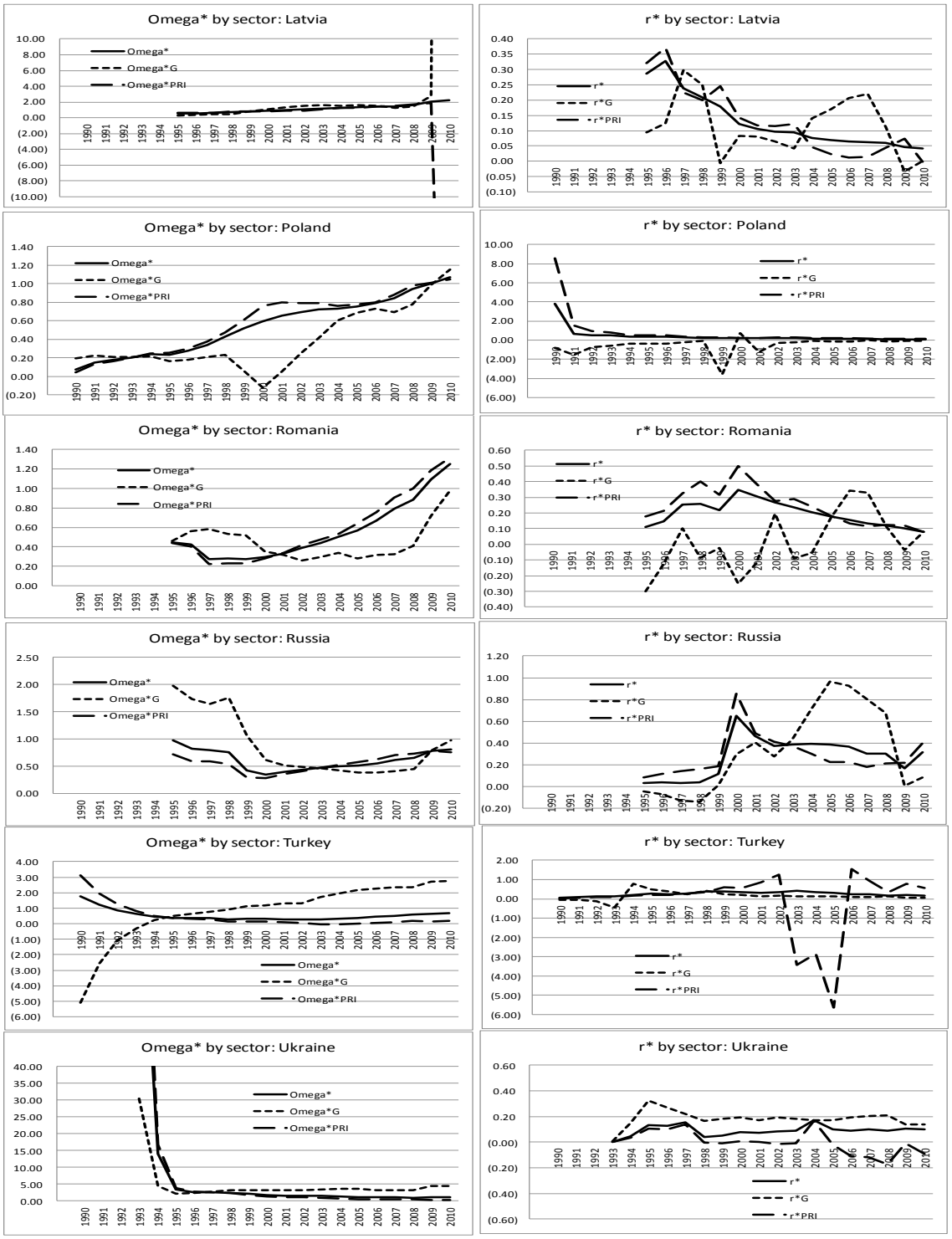
Data source: KEWT 6.12-1 to -3, by country and sector, 1990-2010, whose original data are from *International Financial Statistics Yearbook*, IMF.

Figure O8 The capital-output ratio, Ω^*, and the rate of return, r^*, 1990-2010: 15 country average in Europe; Denmark; Iceland; Norway; Sweden



Data source: KEWT 6.12-1 to -3, by country and sector, 1990-2010, whose original data are from *International Financial Statistics Yearbook*, IMF.

Figure O9 The capital-output ratio, Ω^*, and the rate of return, r^*, 1990-2010: Switzerland; the UK; Bulgaria; Czech Republic; Hungary



Data source: KEWT 6.12-1 to -3, by country and sector, 1990-2010, whose original data are from *International Financial Statistics Yearbook*, IMF.

Figure O10 The capital-output ratio, Ω^*, and the rate of return, r^*, 1990-2010: Latvia; Poland; Romania; Russia; Turkey; Ukraine

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