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Masahiro Endoh*

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1 Introduction

The origin and destination of trade in goods and services matter when it comes both to research and debate over the effects of trade on wages and welfare.[1] In the analysis of trade in financial assets, however, origin and destination of financial assets are not well focused. Some developed and developing countries, for example, have introduced policies aimed at promoting inward foreign direct investment (FDI) as a tool to revitalize and restructure their economies. In estimating the achievement of the policy objective, the amount of total inward FDI often matters to governments. Effects may differ, however, with respect to source and host countries. Foreign companies based in some countries may enjoy managerial and technological advantages of domestic companies as an additional source of profit gained from host countries, while some host countries may have the ability to absorb foreign intangible assets and produce high profit for domestic residents; this has not been well recognized in previous studies.

The broad purpose of this study is to illustrate that the difference between source and host countries is worth considering when we observe the flow of, and the welfare effects of, international financial transactions, as we do for international trade analysis. This paper contains three bodies of analysis. First, I estimate bilateral yields on assets and liabilities whose source and host countries are both among the members of the Organisation for Economic Co-operation and Development (OECD). Second, I conduct an empirical analysis to examine whether the estimated bilateral yields affect investors' decisions concerning the distribution of their assets internationally. Finally, I apply the estimated yields on assets and liabilities to quantify the effects of cross-border capital transactions on outputs and wages of the countries considered, based on the neoclassical one-sector macroeconomic relationship between yields and national output.

As an indicator of rates of return on assets and liabilities, most previous research has employed the sum of capital gains and income yields. I, however, use only income yields, for two reasons

[1] In some developed countries, for example, the relative wage of skilled workers has increased through the 1990s, a phenomenon some attribute to the expansion of imports from developing countries. The rationale of this argument is based on the Heckscher-Ohlin model, in which the welfare effect of starting trade is that owners of a country's abundant factors gain from trade, while owners of a country's scarce factors lose. Also, it is publicly argued that the outsourcing of back office activities to companies in developing countries, a practice that has surged in the 2000s, might decrease wages of workers engaged in corresponding jobs in developed countries or even decrease the number of available jobs.

relating to the aims of this paper. First, I estimate a return on intangible assets that are exchanged in FDI transactions; the difference in income yields between portfolio equity and FDI can be considered to be a return on those assets. Second, income yields are a part of gross national income (GNI), while capital gains are not, and therefore income yields are considered to be essential for estimating the effect of foreign assets on GNI.

There exists a large number of related studies concerning the three research targets mentioned above, so it would be useful to describe here in what ways this paper develops previous discussions. As for the estimation of yields on assets and liabilities, which is the first target of this paper, the benefit the United States (the U.S.) gains from its "exorbitant privilege" attracts a great deal of attention. Because of its pivotal role in the world financial system, the rate the U.S. earns on its foreign claims is sizably higher than the rate it pays on its foreign liabilities. Gourinchas and Rey (2007a) present historical findings that the U.S. enjoyed a substantial premium on its assets relative to its liabilities and that this premium has been increasing since the collapse of the Bretton Woods fixed exchange rate system; the authors attribute the premium to the increase of the risky asset ratio in U.S. external assets. Curcuru, Dvorak, and Warnock (2008) conduct an estimation of U.S. portfolio returns from both the asset and liability sides by using revised data of financial asset positions and flows, and show that the premium is much lower because revisions to U.S. claims positions tend to be large and positive, while revisions to U.S. liabilities tend to be large and negative. Curcuru, Dvorak, and Warnock (2010) further investigate the sources of the premium by decomposing the returns differential between U.S. portfolio claims and liabilities into composition, return, and timing effects. They find that foreign investors in the U.S. persistently exhibit poor timing when reallocating between bonds and equities in their U.S. portfolios.[2]

This paper adopts a more comprehensive approach in the sense that it examines income yields on three kinds of assets in pairs of any two countries. The model for estimation is constructed under the assumption that the factors that determine bilateral income yields can be decomposed into three categories: source country factors, host country factors, and asset factors. This model

[2] Cross-border returns differentials in the U.S. had been often discussed in the context of the possibility of drastic adjustment in the U.S. current account deficit and the exchange rates of the dollar in the 2000s. The background was that the "exorbitant privilege" would mitigate the possibility and the degree of dollar depreciation so as to decrease the U.S. current account deficit. Obstfeld and Rogoff (2005), Gourinchas and Rey (2007b), and Pavlova and Rigobon (2010) take the returns differential in the U.S. into consideration in their simulations.

requires a dataset of financial asset stocks in a multilateral setting, and I consider three kinds of assets: debt, portfolio equity, and FDI. In this framework, for example, we can simultaneously estimate the values of factors which determine the yields on FDI that the U.S. holds in the United Kingdom (the U.K.) and the yields on equities the U.K. possesses in Japan. Adopting a multi-country and multi-asset approach, however, sacrifices some aspects of the detailed analysis developed by Curcuru, Dvorak, and Warnock (2008, 2010) and others. For example, the analysis is based not on monthly or daily data but on yearly data, the period examined is as short as six years, the number of countries explicitly considered is limited to ten OECD countries, a multilateral asset data set is not constructed from more detailed data with high quality, and capital gains on assets are not considered.

The estimation of additional yield on FDI over portfolio equity investment sheds light on incentives to choose FDI over other financial assets and on benefits of FDI for both source and host countries. The characteristics of FDI are the existence of a long-term relationship between the direct investor and the foreign enterprise and a significant degree of influence by the investor on the management of the enterprise. By controlling the management and operation of host enterprises, the investors transmit managerial assets, technologies, and other intangible assets to, or absorb them from, host enterprises.[3] The transfer of intangible assets is the source of additional gain from FDI over portfolio equity investment, which I call FDI premium. The FDI premium over portfolio equity investment may differ by countries, but its estimation has not received enough attention, partly because many researchers do not investigate portfolio equity investment and FDI in the same spectrum of cross-border investment.[4] In this paper I estimate the FDI premiums, which

[3] There are mixed results on whether the directions of FDI flow and accompanying knowledge flow across borders are the same or opposite. Van Pottelsberghe de la Porterie and Lichtenberg (2001), using panel data of 13 OECD member countries from 1971 to 1990, show that FDI transfers technology from R&D-intensive host countries to source countries. On the other hand, Lee (2006), using country-level data from 16 OECD countries from 1981 to 2000, and Bitzer and Kerekes (2008), using industry-level data from 17 OECD countries from 1973 to 2000, both present the empirical results that host countries of FDI benefit from R&D spillovers from source countries. Branstetter (2006), using data on patent citations between Japanese investing firms and American indigenous firms, shows that FDI increases the flow of knowledge spillovers both from and to the investing Japanese firms.

[4] Lane and Milesi-Ferretti (2003) is one of the exceptions. They calculate rates of return on foreign assets and liabilities, which are income yields plus capital gains, for portfolio equity, FDI, and debt, and investigate whether they are well tracked by domestic market indices. They also document the discussion over measurement error problems for balance-of-payment-derived income yields and capital gains, the method this paper also relies on, and the lack of information concerning the currency composition of external assets and liabilities, from which this paper also suffers. They do not, however, track down source and host country factors that make rates of return on FDI

reflect the advantages of FDI idiosyncratic to both home and host countries.

Although intangible asset transfers accompanied by FDI probably occur in two ways between source and host countries, in this paper I consider the situation in which the directions of FDI flow and of intangible assets flow are the same. That is, the source of the estimated FDI premium is intangible assets transferred from direct investors in the source country to foreign affiliates. This is because in this paper I proceed on the assumption that the benefit of transferring intangible assets accompanied with FDI is estimated from the data on *Balance of Payments Statistics* (BOPS) issued by the International Monetary Fund (IMF). When host enterprises of FDI absorb direct investors' intangible assets, a part of the yielded additional benefit is remitted to investors as investment income, which we can observe in the term "direct invest income" on balance of payments statistics.[5] When a direct investor absorbs a host enterprise's intangible assets, on the other hand, the headquarters of the direct investor usually does not remit any yielded additional benefit to the foreign affiliates that are the source of intangible assets, and therefore the yielded benefit is not recorded on balance of payment statistics.

Concerning the effect of income yields on assets and liabilities in the determination of international asset allocation, the second target of this paper, some researchers incorporate a set of returns in source and host countries as an explanatory variable, and the results are not conclusive regarding the idea that asset returns affect international capital transactions. Portes and Rey (2005) use covariances of stock market returns as a proxy for risk diversification opportunities in their gravity-model estimation and conclude that there is weak evidence of a diversification motive for equity flows. Aviat and Coeurdacier (2007) use an expected gross return on assets as an explanatory variable in their estimation of a gravity model for trade in banking financial assets in a multilateral setting. It shows that gross returns of assets in a host country do not have a statistically significant effect on the volume of its holdings by a source country when other

and portfolio equity different in a multilateral setting, which this paper pursues. Daude and Fratzscher (2008) is one other exception. They examine a "pecking order" of FDI, portfolio equities, debts, and loans in cross-border investment, but do not consider rates of return as an explanatory variable.

[5] "Direct investment income" does not only count dividends of stocks remitted to source countries of FDI. It is composed of "dividends and distributed branch profits," "reinvested earnings and undistributed branch profits," and "income on debt (interest)," in BOPS. Since it comprises the wide range of benefits that transmitted intangible assets might bring about in foreign affiliates, it is an appropriate term with which to grasp the additional benefit of intangible assets of FDI transmitted from source to host countries.

factors, like common language and legal systems, are taken into account at the same time. De Santis and Gérard (2009) investigate the determinants of bilateral international equity and bond portfolio reallocation across countries, and show that the market bond return of a host country positively affects its portfolio weight, while market equity return of a host country does not affect its weight. Forbes (2010) analyzes foreign investment in U.S. equities and bonds, and shows that countries with higher equity returns relative to the U.S. hold lower shares of U.S. equities in their portfolios, while there is not such a relationship in the case of U.S. bonds (contrary to De Santis and Gérard (2009)). No previous paper, however, uses bilateral income yields as an explanatory variable or considers portfolio investment and FDI at the same time. By employing a logit model with bilateral return data, this paper develops their arguments by incorporating these questions. It shows robust evidence that the deviation of income yields has a stable effect on the holding of these assets by source countries through cross terms with distance and income, while the effect of income is relatively weak and unstable.

As for the effect of cross-border capital transactions on outputs and wages, the third target of the paper, most empirical papers limit their research scope to a certain aspect or two of this comprehensive issue.[6] One recent exception is Burstein and Monge-Naranjo (2009), who extend a standard neoclassical model by introducing management know-how as an additional factor of production. They construct a model to investigate the aggregate consequence of the international reallocation of management know-how from developed to developing countries, and estimate how much the output and welfare of developing countries increase. The main difference between Burstein and Monge-Naranjo (2009) and this paper is the treatment of factors that generate firm-embedded productivity. Burstein and Monge-Naranjo (2009) see management know-how as belonging to individuals as a generator of firm-embedded productivity, and they assume management know-how to be reallocatable separately from capital, though both are complementary factors. In this paper, I consider intangible assets as factors that determine the ratio of effective capital value to nominal capital value, and assume the ratio to be given and fixed for simplicity. Intangible assets cannot move independently from capital; they are accompanied by it.[7]

[6] Aitken et al. (1996), Gopinath and Chen (2003), and Alhakimi and Peoples (2009), for example, deal exclusively with the effect of FDI on wages.

[7] International risk-sharing and consumption smoothing are other main viewpoints of empirical study concerning

This paper is organized as follows. Section 2 develops a framework of the model, with emphasis on how income yields of financial assets are determined. Section 3 presents the estimation results of source and host country factors of income yields in the case of ten OECD countries. These results are employed to see whether income yields explain the international financial asset allocation in Section 4. Section 5 shows the income effects of international financial asset allocation on workers and capitalists in each country. The summary and conclusion are presented in the final section.

2 Framework of income yields determination

In this paper I refer to three kinds of assets: real assets such as machinery and architecture, intangible assets brought from foreign countries by cross-border investments such as a foreign firm's managerial assets and firm-specific technology, and financial assets such as stocks and bonds.[8]

Total value of real assets in country i's economic units in year y is $RK_{i,y}$. I assume that the total value of intangible assets brought from foreign countries can be calculated by using the method explained later, and the value in country i in year y is $IK_{i,y}$. The nominal value of net domestic product in country i in year y, $NDP_{i,y}$ is determined from the following equation:

$$NDP_{i,y} = A_{i,y} \left(L_{i,y}\right)^{\alpha_{i,y}} \left(RK_{i,y} + IK_{i,y}\right)^{1-\alpha_{i,y}} \quad , \tag{1}$$

where $A_{i,y}$ is the measure of Hicks-neutral technological progress, $L_{i,y}$ is domestic labor, and $\alpha_{i,y}$ is a parameter ($0 < \alpha_{i,y} < 1$). $IK_{i,y}$ is defined as $IK_{i,y} = \sum_{j \in S_j, j \neq i} \sum_{k \in S_k} IK^j_{i,k,y}$, where $IK^j_{i,k,y}$ is a total amount of intangible assets transferred from country j accompanied with cross-border investment from country j to asset k in country i ($i \neq j$). There are host countries $i \in S_i$, source countries $j \in S_j$, and financial assets $k \in S_k$ to invest, where S_i, S_j, and S_k are sets of host countries, source countries, and financial assets, respectively.

the macroeconomic benefit of international financial transactions. See, for example, van Wincoop (1999), Athanasoulis and van Wincoop (2000), and Bekaert et al. (2006). This aspect is beyond the scope of this paper.

[8] It is natural to assume that intangible assets also come from domestic investment. In this paper, however, intangible assets brought by domestic investment are considered to determine total factor productivity in the national production function explained later for a technical reason of model structure.

Each investor in country i has one nominal unit of fund f_y^i and decides which asset to purchase in the exchange of f_y^i in a two-stage decision-making process in year y. An investor decides whether to purchase domestic assets or foreign assets in the first stage, then chooses one particular asset to purchase from various types of domestic or foreign assets in the second stage. In this paper, I focus on investors' decision on what foreign asset to purchase in the exchange of f_y^i in the second stage, given the result of the first stage decision.

Let $f_{j,k,y}^i$ denote one nominal unit of financial assets invested from source country i to asset k in host country j in year y, $rk_{j,k,y}^i$ denote real assets in country j financed by $f_{j,k,y}^i$, and $ik_{j,k,y}^i$ denote intangible assets in country j financed by $f_{j,k,y}^i$ $(i \neq j)$. The nominal value of financial asset $f_{j,k,y}^i$ is generally larger than that of the corresponding real asset $rk_{j,k,y}^i$ since not all financed money by firms and governments is used for investments. The ratio of $rk_{j,k,y}^i$ to $f_{j,k,y}^i$ is denoted by $a_{j,y}$ for all i and k: $a_{j,y} = rk_{j,k,y}^i / f_{j,k,y}^i$. Also, the ratio of $ik_{j,k,y}^i$ to $f_{j,k,y}^i$ is denoted by $b_{j,k,y}^i$: $b_{j,k,y}^i = ik_{j,k,y}^i / f_{j,k,y}^i$ $(i \neq j)$. $b_{i,k,y}^i = 0$ for all i and k from the assumption. $a_{j,k,y}^i$ is defined as $a_{j,k,y}^i = a_{j,y} + b_{j,k,y}^i$. I assume $a_{j,y}$ and $b_{j,k,y}^i$, and therefore $rk_{j,k,y}^i$ and $ik_{j,k,y}^i$, are stochastic variables.

Each f_y^i has a common vector of stochastic variables $a_y^i = \left\{a_{j,k,y}^i | j \in S_j, k \in S_k\right\}$. a_y^i affects a decision on asset allocation in the second-stage decision-making process by investors in country i in year y. Each $a_{j,k,y}^i$ is independent, and has an expected value $E(a_{j,k,y}^i) = E(a_{j,y}) + E(b_{j,k,y}^i) = \underline{a}_{j,y} + \underline{b}_{j,k,y}^i$, where $\underline{b}_{i,k,y}^i = 0$ for all i and k. I do not examine the analysis of domestic investment in the second-stage decision-making process explicitly. The number of units of $f_{j,k,y}^i$ is $n_{j,k,y}^i$, which is the same as the number of $rk_{j,k,y}^i$ and $ik_{j,k,y}^i$ (when $i \neq j$) from the definition. I assume $n_{j,k,y}^i$ is sufficiently large to apply the law of large numbers to $a_{j,k,y}^i$.

The nominal value of financial assets invested in country i's economic units in year y, $F_{i,y}$, is defined as $F_{i,y} = F_{i,y}^i + \sum_{j \in S_j, j \neq i} \sum_{k \in S_k} F_{i,k,y}^j$, where $F_{i,y}^i = \sum_{k \in S_k} n_{i,k,y}^i f_{i,k,y}^i$ is the financial assets invested by domestic investors and $F_{i,k,y}^j = n_{i,k,y}^j f_{i,k,y}^j$ $(i \neq j)$ refers to the financial assets invested by foreign investors. $F_{i,y}$ is larger than the sum of real assets located in country i in year y, $RK_{i,y}$, and larger than that of intangible assets, $IK_{i,y}$, where $RK_{i,y} = RK_{i,y}^i + \sum_{j \in S_j, j \neq i} \sum_{k \in S_k} RK_{i,k,y}^j$, $RK_{i,y}^i = \sum_{k \in S_k} n_{i,k,y}^i rk_{i,k,y}^i$, $RK_{i,k,y}^j = n_{i,k,y}^j rk_{i,k,y}^j$ $(i \neq j)$, $IK_{i,y} = \sum_{j \in S_j, j \neq i} \sum_{k \in S_k} IK_{i,k,y}^j$, and $IK_{i,k,y}^j = n_{i,k,y}^j ik_{i,k,y}^j$ $(i \neq j)$. $RK_{i,y}^i = \underline{a}_{i,y} F_{i,y}^i$, $RK_{i,k,y}^j = \underline{a}_{i,y} F_{i,k,y}^j$, and $IK_{i,k,y}^j = \underline{b}_{i,k,y}^j F_{i,k,y}^j$ $(i \neq j)$

from the law of large numbers.

The nominal value of net national income in country i in year y, $NNI_{i,y}$, is defined as

$$NNI_{i,y} = NDP_{i,y} + \sum_{j \in S_j, j \neq i} \sum_{k \in S_k} r^i_{j,k,y} F^i_{j,k,y} - \sum_{j \in S_j, j \neq i} \sum_{k \in S_k} r^j_{i,k,y} F^j_{i,k,y} \quad . \tag{2}$$

$r^i_{j,k,y}$ is the nominal rate of income that source country i gains from financial asset k invested in host country j in year y. Equation 2 shows that net national income is composed of three parts: net domestic product (the first term of the right-hand side of Equation 2), investment income gained from foreign countries (second term), and investment income paid to foreign countries (third term).[9]

The nominal rate of income gain from $F^i_{i,y}$ in year y, $r^i_{i,y}$, is determined from the marginal product of $RK^i_{i,y} = \underline{a}_{i,y} F^i_{i,y}$.

$$r^i_{i,y} = \frac{\underline{a}_{i,y} (1 - \alpha_{i,y}) NDP_{i,y}}{RK_{i,y} + IK_{i,y}} \quad . \tag{3}$$

$r^i_{i,y}$ refers to the nominal base rate of income gain for both domestic and foreign investors in host country i in year y. Similarly, the nominal rate of income gain of source country j from $F^j_{i,k,y}$ in year y, $r^j_{i,k,y}$, is expressed as

$$r^j_{i,k,y} = \frac{\underline{a}^j_{i,k,y} (1 - \alpha_{i,y}) NDP_{i,y}}{RK_{i,y} + IK_{i,y}} \qquad \forall j \neq i \quad , \tag{4}$$

where $\underline{a}^j_{i,k,y} = \underline{a}_{i,y} + \underline{b}^j_{i,k,y}$. This paper assumes that factors which determine $\underline{b}^j_{i,k,y}$ are written as

$$\underline{b}^j_{i,k,y} = \frac{s^j_{k,y} + t_{i,k,y}}{\frac{(1-\alpha_{i,y}) NDP_{i,y}}{RK_{i,y} + IK_{i,y}}}, \qquad \forall j \neq i \quad , \tag{5}$$

where $s^i_{k,y}$ and $t_{j,k,y}$ represent source country i's and host country j's factors, respectively, to determine $\underline{b}^i_{j,k,y}$ in each asset k and year y. From equations (3), (4) and (5),

[9] Generally speaking, net national income includes the net compensation of employees from abroad. In this paper, however, I don't put net compensation in Equation (2). This is because the amount of employees' compensation is quite small compared with investment incomes in developed countries, and I apply this framework of model to the data of OECD countries later in the paper.

$$r^j_{i,k,y} = r^i_{i,y} + s^j_{k,y} + t_{i,k,y} \quad . \tag{6}$$

$s^i_{k,y}$ and $t_{j,k,y}$ can be interpreted differently with respect to k. In this paper I consider three kinds of financial assets: debt securities, equity securities as portfolio investment, and foreign direct investment (FDI). First, in the case of debt ($k = Debt$), $s^i_{Debt,y}$ is the rate of profit from source country i's ability to find profitable debt investment opportunities, or country i's serendipity in finding debt investment opportunities, in year y, and $t_{j,Debt,y}$ is the rate of profit from host country j's capacity to utilize debt investment from foreign countries in year y. I assume, however, $t_{j,Debt,y} = 0$, that is, the nationality of host countries is indifferent with respect to the utilization of borrowed money in the form of debt. Second, in the case of portfolio equity ($k = Equity$), $s^i_{Equity,y}$ is the rate of profit from source country i's ability to find profitable equity investment opportunities, or country i's serendipity in finding equity investment opportunities, in year y, and $t_{j,Equity,y}$ is the rate of profit from host country j's capacity to utilize equity investment from foreign countries in year y. Third, in the case of FDI ($k = FDI$), since the effect of management asset and technology transplantation additionally needs to be considered, I assume $s^i_{FDI,y} = s^i_{Equity,y} + u^i_{FDI,y}$ and $t_{j,FDI,y} = t_{j,Equiity,y} + v_{j,FDI,y}$. $u^i_{FDI,y}$ is the rate of profit from managerial asset and technology possessed by source country i in year y. $v_{j,FDI,y}$ is mainly composed of two factors: the rate of profit from the absorptive capability of foreign managerial assets and technologies, and the effectiveness of regulations on FDI that prevent foreign investors from allocating their assets efficiently, in host country j in year y. The former factor affects $v_{j,FDI,y}$ positively, while the latter factor affects $v_{j,FDI,y}$ negatively.

On the asset side, the nominal income yield of a source country i from foreign financial assets $k \in S_k$ in year y, $r^i_{k,y}$, is expressed as the weighted sum of $r^i_{j,k,y}$, with respect to $F^i_{j,k,y}$.

$$r^i_{k,y} = \frac{R^i_{k,y}}{F^i_{k,y}} = \sum_{j \in S_j, j \neq i} \frac{R^i_{j,k,y}}{F^i_{j,k,y}} \frac{F^i_{j,k,y}}{F^i_{k,y}} = \sum_{j \in S_j, j \neq i} r^i_{j,k,y} \frac{F^i_{j,k,y}}{F^i_{k,y}} \quad , \tag{7}$$

where $R^i_{j,k,y}$ is the investment income source country i gains from financial asset k in host country

j in year y, $R^i_{k,y} = \sum_{j \in S_j, j \neq i} R^i_{j,k,y}$, and $F^i_{k,y} = \sum_{j \in S_j, j \neq i} F^i_{j,k,y}$.[10] Similarly, on the liability side, the nominal rate of income gain on asset k that host country j pays in year y, $r_{j,k,y}$, is expressed as the weighted sum of $r^i_{j,k,y}$ with respect to $F^i_{j,k,y}$, that is,

$$r_{j,k,y} = \frac{R_{j,k,y}}{F_{j,k,y}} = \sum_{i \in S_i, i \neq j} \frac{R^i_{j,k,y}}{F^i_{j,k,y}} \frac{F^i_{j,k,y}}{F_{j,k,y}} = \sum_{i \in S_i, i \neq j} r^i_{j,k,y} \frac{F^i_{j,k,y}}{F_{j,k,y}} \quad , \tag{8}$$

where $R_{j,k,y} = \sum_{j \in S_j, j \neq i} R^i_{j,k,y}$ and $F_{j,k,y} = \sum_{j \in S_j, j \neq i} F^i_{j,k,y}$.

From equations (7), (8) and (6), $r^i_{k,y}$ on the asset side and $r_{j,k,y}$ on the liability side are expressed as follows:

$$r^i_{k,y} = s^i_{k,y} + \sum_{j \in S_j, j \neq i} \left(r^j_{j,y} + t_{j,k,y} \right) \frac{F^i_{j,k,y}}{F^i_{k,y}} \quad , \tag{9}$$

$$r_{j,k,y} = \sum_{i \in S_i, i \neq j} s^i_{k,y} \frac{F^i_{j,k,y}}{F_{j,k,y}} + \left(r^j_{j,y} + t_{j,k,y} \right) \quad . \tag{10}$$

The first terms of the right-hand side of equations (9) and (10), $s^i_{k,y}$ and $\sum_i s^i_{k,y} \frac{F^i_{j,k,y}}{F_{j,k,y}}$, are source country i's factors, which determine $r^i_{k,y}$ and $r_{j,k,y}$, respectively, while the second terms, $\sum_j \left(r^j_{j,y} + t_{j,k,y} \right) \frac{F^i_{j,k,y}}{F^i_{k,y}}$ and $r^j_{j,y} + t_{j,k,y}$, are host country j's factors. In other words, $s^i_{k,y}$ and $r^j_{j,y} + t_{j,k,y}$ are domestic factors and $\sum_i s^i_{k,y} \frac{F^i_{j,k,y}}{F_{j,k,y}}$ and $\sum_j \left(b_{j,y} + t_{j,k,y} \right) \frac{F^i_{j,k,y}}{F^i_{k,y}}$ are foreign factors for $r^i_{k,y}$ and $r_{j,k,y}$, respectively.

In equations (9) and (10), $r^i_{k,y}$, $r_{j,k,y}$, $F^i_{j,k,y}$, $F^i_{k,y}$, and $F_{j,k,y}$ are known from existing data sets, explained in the next subsection, while others are not. Therefore, when the world is composed of N countries, there are $6N$ unknown variables of $r^j_{j,y}$, $s^i_{Debt,y}$, $s^i_{Equity,y}$, $t_{j,Equity,y}$, $u^i_{FDI,y}$, and $v_{j,FDI,y}$, for each year y, while the total number of equations (9) and (10) is $6N$ ($2N$ for each k). This system looks solvable. However, it is not, since one equation out of N's equations (9) or (10) for each k is linearly dependent on other $N-1$ equations, from the constraints $\sum_j \frac{F^i_{j,k,y}}{F^i_{k,y}} = 1$ and $\sum_i \frac{F^i_{j,k,y}}{F_{j,k,y}} = 1$. To make this system solvable for each year, I categorize countries whose individual income yields cannot be estimated as "the rest of the world" and treat six variables concerning

[10] Since $F^i_{j,k,y}$ and $R^i_{j,k,y}$ are generally composed of not only assets and incomes denominated in terms of country j's currency but also those denominated in terms of other currencies, $r^i_{k,y}$ and $r^i_{j,k,y}$ varies as exchange rates between currencies change. In this model, however, I do not explicitly consider the denominations of securities, on the assumption that there is only a negligible effect of exchange rates on $r^i_{k,y}$ and $r^i_{j,k,y}$.

it, $r^{ROW}_{ROW,y}$, $s^{ROW}_{Debt,y}$, $s^{ROW}_{Equity,y}$, $t_{ROW,Equity,y}$, $u^{ROW}_{FDI,y}$, and $v_{ROW,FDI,y}$, as exogenous. As I explain in the next section, there are ten OECD countries which are not categorized into the rest of the world and whose individual income yields are estimated.

3 Estimation results of income yield factors

3.1 Data set

The analysis is conducted for six years, from the year 2001, after the end of the dot-com boom, to the year 2006, before the peak of housing prices in the U.S. and the consequent international financial crisis. I employ OECD countries' data, mainly because data are widely available and include important financial transactors.

I use three different data sources to construct a database of multilateral financial transactions of OECD countries, which includes bilateral financial inward and outward stocks of debt, equity, and FDI ($F^i_{j,k,y}$) and income yields as a source and host country ($r^i_{k,y}$ and $r_{j,k,y}$). These three data sources are recorded in nominal U.S. dollars. First, *the Consolidated Portfolio Investment Survey* (CPIS) by the International Monetary Fund (IMF) is for bilateral assets of debt and equity ($F^i_{j,Debt,y}$, $F^i_{j,Equity,y}$). Unfortunately, there are some missing entries, so I do not have bilateral stocks for all OECD country pairs.

Second, *the SourceOECD International Direct Investment Statistics* (DIS) database is for bilateral FDI inward and outward positions ($F^i_{j,FDI,y}$). In DIS, however, the value of $F^i_{j,FDI,y}$ reported by source country i is quite different from that reported by host country j, and in some cases $F^i_{j,FDI,y}$ are reported only from countries i or j, but not both. Therefore, I construct the table of $F^i_{j,FDI,y}$ by taking an average of them as reported by country i and country j when $F^i_{j,FDI,y}$ are available from both countries, by using the available value of $F^i_{j,FDI,y}$ when it is reported only from countries i or j. I have left it blank when there is no entry for $F^i_{j,FDI,y}$ in either countries. In spite of this procedure, there are still many missing entries.

Third, *the Balance of Payments Statistics* (BOPS) by IMF is for calculating $r^i_{k,y}$ and $r_{j,k,y}$ from $R^i_{k,y}$, $R_{j,k,y}$, $F^i_{k,y}$, and $F_{j,k,y}$. All $R^i_{k,y}$ are in "investment income, credit," while all $R_{j,k,y}$ are in "investment income, debit" in the standard presentation of BOPS of country i at year y. $R^i_{Debt,y}$ and $R_{j,Debt,y}$ are "income on bonds and notes" plus "income on money market instruments," $R^i_{Equity,y}$ and $R_{j,Equity,y}$ are "income on equity," and $R^i_{FDI,y}$ and $R_{j,FDI,y}$ are "direct investment income." As for $F^i_{k,y}$ and $F_{j,k,y}$, all $F^i_{k,y}$ are on the asset side of "international investment position," while all $F_{j,k,y}$ are on the liability side. $F^i_{Debt,y}$ and $F_{j,Debt,y}$ are "debt securities," $F^i_{Equity,y}$ and $F_{j,Equity,y}$ are "equity securities," both being subgroups of "portfolio investment." $F^i_{FDI,y}$ and $F_{j,FDI,y}$ are "direct investment abroad."

Of 30 OECD countries, some are considered to be inappropriate as individual examinees in this model because of their data availability and reliability. I have grouped them together with non-OECD countries as the rest of the world. I applied five criteria to determine which countries are excluded from my bilateral data set and bundled them up as the rest of the world: (1) Data unavailability for rates of income gain in any asset and year, (2) implausibly high averages of rates of income gain, (3) implausibly high variances of rates of income gain, (4) implausibly large amounts of bilateral stocks among OECD countries, and (5) excessive amounts of missing entries in bilateral stock data among OECD countries. A detailed description of country selection is in Appendix A. After screening based on these five criteria, ten countries remain as individual examinees in my analysis: Denmark (DEN), Finland (FIN), Germany (GER), Greece (GRE), Japan (JPN), Portugal (POR), Spain (ESP), Sweden (SWE), the U.K. (GBR), the U.S. (USA). The other 20 remaining OECD countries and non-OECD countries are classified together as the rest of the world (ROW).

As for the basic information, Table A1 in Appendix summarizes $r^i_{k,y}$ and $r_{j,k,y}$ for i, j = DEN, FIN, GER, GRE, JPN, POR, ESP, SWE, GBR, USA, k =Debt, Equity, FDI, and y = 2001 - 2006. Also, Table A2 shows $F^i_{j,k,y}$, $F^i_{ROW,k,y}$, $F^{ROW}_{j,k,y}$, $F^i_{k,y}$, and $F_{j,k,y}$, in year $y = 2006$.

The estimated values of $r^j_{j,y}$, $s^i_{Debt,y}$, $s^i_{Equity,y}$, $t_{j,Equity,y}$, $u^i_{FDI,y}$, and $v_{j,FDI,y}$, depend on those for i, j = ROW: $r^{ROW}_{ROW,y}$, $s^{ROW}_{Debt,y}$, $s^{ROW}_{Equity,y}$, $t_{ROW,Equity,y}$, $u^{ROW}_{FDI,y}$, and $v_{ROW,FDI,y}$. Since we do not have any reliable estimates of these exogenous variables for ROW, I mainly consider three cases

as follows.

Case 1 (low estimates for ROW): $r^{ROW}_{ROW,y} = 1\%$, $s^{ROW}_{Debt,y} = 0\%$, $s^{ROW}_{Equity,y} = 0\%$, $t_{ROW,Equity,y} = -1\%$, $u^{ROW}_{FDI,y} = 1\%$, and $v_{ROW,FDI,y} = 0\%$ for all y.

Case 2 (medium estimates for ROW): $r^{ROW}_{ROW,y} = 2\%$, $s^{ROW}_{Debt,y} = 1\%$, $s^{ROW}_{Equity,y} = 1\%$, $t_{ROW,Equity,y} = 0\%$, $u^{ROW}_{FDI,y} = 3\%$, and $v_{ROW,FDI,y} = 1\%$ for all y.

Case 3 (high estimates for ROW): $r^{ROW}_{ROW,y} = 3\%$, $s^{ROW}_{Debt,y} = 2\%$, $s^{ROW}_{Equity,y} = 2\%$, $t_{ROW,Equity,y} = 1\%$, $u^{ROW}_{FDI,y} = 5\%$, and $v_{ROW,FDI,y} = 2\%$ for all y.

3.2 The composition of source and host factors

Figure I shows the decomposed results of calculation along with the first term (source country factors) and the second term (host country factors) of the right-hand side of equations (9) and (10). Panels (a) and (b) deal with the estimation results for the case of debt. Panel (a) shows the arithmetic means of nominal income yields for the asset side $r^i_{Debt,y}$ for $y = 2001 - 2006$, $\overline{r}^i_{Debt}$ (a letter with upper var means average value for six years), and the parts of those contributed by source country factors $\overline{s}^i_{Debt}$, which are calculated from the first term of the right-hand side of equation (9), for Cases 1-3. $\overline{r}^i_{Debt}$ of ten OECD countries ranges from 2.63% (GRE) to 5.14% (USA). Source country factors $\overline{s}^i_{Debt}$ are generally larger in Case 1 (low estimates for ROW), but still their share is about half of $\overline{r}^i_{Debt}$. Similarly, panel (b) shows the arithmetic means of nominal income yields for the liability side $r_{j,Debt,y}$ for $y = 2001 - 2006$, $\overline{r}_{j,Debt}$, and the parts of those contributed by host country factors $\overline{r}^j_j$ ($\overline{t}_{j,Debt}$ is assumed to be zero in this paper), which are calculated from the second term of the right-hand side of equation (10), for Cases 1-3. $\overline{r}_{j,Debt}$ ranges from 2.13% (JPN) to 4.09% (USA). Again, $\overline{r}^j_j$ are larger in Case 1, and these host country factors dominate in all three cases. Even in Case 3, source country factors ($\sum_i s^i_{k,y} \frac{F^i_{j,k,y}}{F_{j,k,y}}$) account for at most about half of $\overline{r}_{j,Debt}$, with the exception of Greece and Japan. These findings imply that host country factors r^j_j dominate source country factors $s^i_{Debt,y}$ when it comes to determining $r^i_{j,Debt,y}$.

[Insert Figure I here]

Panels (c) and (d) deal with the estimation results for equity. Panel (c) shows the arithmetic means of income yields for the asset side $\overline{r}^{i}_{Equity}$, and the parts of those contributed by source country factors $\overline{s}^{i}_{Equity}$ for Cases 1-3. $\overline{r}^{i}_{Equity}$ ranges from 0.60% (GRE) to 3.95% (JPN). $\overline{s}^{i}_{Equity}$ are again larger in Case 1, but they have unstable values depending on each case. Panel (d) shows the arithmetic means of income yields for the liability side $\overline{r}_{j,Equity}$, and the parts of those contributed by host country factors $\overline{r}^{j}_{j} + \overline{t}_{j,Equity}$ for Cases 1-3. $\overline{r}_{j,Equity}$ ranges from 0.81% (JPN) to 2.71% (GER, GBR). $\overline{r}^{j}_{j} + \overline{t}_{j,Equity}$ are stable compared with $\overline{s}^{i}_{Equity}$ with respect to three cases, and their shares in $\overline{r}_{j,Equity}$ are generally large. This means that host country factors $r^{j}_{j} + t_{j,Equity}$ have a dominant and stable effect on the determination of $r^{i}_{j,Equity,y}$, a result similar to that of debt securities investment. It reflects the feature of security investment in the sense that the information of the bond and equity market, as well as each bond and equity, are well standardized and commonly known to all investors. There is, therefore, little room to wield "serendipity," or the ability to find profitable asset investment opportunities for source countries.

Panels (e) and (f) are the case of FDI. Panel (e) shows the arithmetic means of income yields for the asset side $\overline{r}^{i}_{FDI}$, and the parts of those contributed by source country factors $\overline{s}^{i}_{FDI}$ for Cases 1-3. $\overline{r}^{i}_{FDI}$ ranges from 2.89% (GRE) to 9.47% (USA). $\overline{s}^{i}_{FDI}$ differs depending on the case. In Case 1 $\overline{s}^{i}_{FDI}$ explains the major part of $\overline{r}^{i}_{FDI}$ in every country. Panel (f) shows the arithmetic means of income yields for the liability side $\overline{r}_{j,FDI}$, and the parts of those contributed by host country factors $\overline{r}^{j}_{j} + \overline{t}_{j,FDI}$ for Cases 1-3. $\overline{r}_{j,FDI}$ ranges from 3.95% (GRE) to 9.12% (FIN). Again, $\overline{r}^{j}_{j} + \overline{t}_{j,Equity}$ differs in each case, but generally it explains only a small part of $\overline{r}_{j,FDI}$. In the case of FDI, source country factors $\overline{s}^{i}_{FDI}$ matter when it comes to determining income yields. From this result we can infer that FDI premium over portfolio equity investment is yielded mainly from intangible assets of the source country, not from the absorptive capability of intangible assets and the economic inefficiency of FDI regulations in the host country.

3.3 The estimates of six components

From the estimation results summarized in Figure I, we can obtain the values of each component of source and host country factors, $r^j_{j,y}$, $s^i_{Debt,y}$, $s^i_{Equity,y}$, $t_{j,Equity,y}$, $u^i_{FDI,y}$, and $v_{j,FDI,y}$. Figure II shows the six-year average values of these factors for three cases. Panels (a) to (d) are the average base rate of income gain in host country j, $\overline{r}^j_j$, the average rate of "serendipity," or the ability to find profitable debt investment opportunities in source country i, $\overline{s}^i_{Debt}$, that for equity investment opportunities in source country i, $\overline{s}^i_{Equity}$, and the average foreign equity utilization rate in host country j, $\overline{t}_{j,Equity}$, respectively. Also, Panels (e) and (f) are the average profit rate of managerial asset and technology possessed by source country i, $\overline{u}^i_{FDI}$, and the average rate of absorptive capability of foreign managerial asset and technology in host country j, $\overline{v}_{j,FDI}$, respectively.

[Insert Figure II here]

In panel (a), we see two features regarding the variance of $\overline{r}^j_j$. First, the variance of $\overline{r}^j_j$ for ten countries is fairly small in all three cases: the gap between the minimum and the maximum values of $\overline{r}^j_j$ in each case is about two percent. Second, the variance of $\overline{r}^j_j$ for three cases is quite similar for ten countries: the gap between the values of Case 1 and Case 2, and those of Case 2 and Case 3, are around one-half percent for all ten countries. Generally speaking, $\overline{s}^i_{Debt}$, $\overline{s}^i_{Equity}$, and $\overline{t}_{j,Equity}$ have the same features as those of $\overline{r}^j_j$, while $\overline{u}^i_{FDI}$ and $\overline{v}_{j,FDI}$ don't. All the values of $\overline{r}^j_j$, $\overline{s}^i_{Debt}$, $\overline{s}^i_{Equity}$, and $\overline{t}_{j,Equity}$ range from 3.57% ($\overline{r}^{USA}_{USA}$ in Case 1) to -2.62% ($\overline{t}_{USA,Equity}$ in Case 1), while both $\overline{u}^i_{FDI}$ and $\overline{v}_{j,FDI}$.range wider, from 8.00% ($\overline{u}^{SEW}_{FDI}$ in Case 1) to -0.04% ($\overline{u}^{GRE}_{FDI}$ in Case 3) for $\overline{u}^i_{FDI}$ and from 2.23% ($\overline{v}_{JPN,FDI}$ in Case 3) to -4.33% ($\overline{v}_{GERj,FDI}$ in Case 3) for $\overline{v}_{j,FDI}$. It clearly shows the importance of capital nationality, which determines FDI premiums. Panel (e) shows that companies in Finland, Sweden, the U.K., and the U.S. have high-yielding managerial assets and technologies, at around six percent.[11] As for the host factors of FDI premiums such as the absorptive capability of foreign intangible assets and the economic inefficiency of FDI regulations, panel (f) shows Finland, Japan, and Sweden have positive $\overline{v}_{j,FDI}$ in all three cases, which may imply that these three countries utilize the positive effect of FDI most. On the other hand, other

[11] It is beyond the scope of this paper to identify factors which determine $\overline{u}^i_{FDI}$, though it is an intriguing question. Bloom and Van Reenen (2007, 2010) show that, from their extensive and multinational manufacturing firms survey, higher management scores are robustly associated with better performance, and they also pursue the factors which explain the differences in management practices. To investigate $\overline{u}^i_{FDI}$ from this aspect is left for future analysis.

countries' $\overline{v}_{j,FDI}$ are unstable, and become negative in Cases 2 and 3.

4 Income yields as determinants of international capital allocation

4.1 Methodology

In this section, I conduct an empirical analysis to examine whether bilateral income yields estimated in the previous section affect investors' decisions concerning international asset distribution. If estimated income yields are shown to be statistically significant factors on investors' decision, this result can be considered an indirect justification for linear algebraic methodology regarding factor decomposition of income yields proposed in this paper.

I consider international capital allocation in year 2006. Let $U^i_{j,k,2006}$ $(i \neq j)$ represent the value of the utility that an investor in country i obtains $f^i_{j,k,2006}$ $(i \neq j)$ by using f^i_{2006} in year 2006. This utility is defined in terms of three parts: the parameters associated with the explanatory variables, β, the explanatory variables themselves, $X^i_{j,k,2006}$, and a random component, $\varepsilon^i_{j,k,2006}$.

$$U^i_{j,k,2006} = \beta' X^i_{j,k,2006} + \varepsilon^i_{j,k,2006} \quad . \tag{11}$$

Under the assumption that random components are i.i.d. and follow a Type I extreme value distribution, the probability that an investor in any country i chooses $f^i_{j,k,2006}$, $\Pr\left(f^i_{j,k,2006}\right)$, is given by the familiar logit formula

$$\Pr\left(f^i_{j,k,2006}\right) = \frac{\exp\left(\beta' X^i_{j,k,2006}\right)}{\sum_{l \in S_j, l \neq i} \sum_{m \in S_k} \exp\left(\beta' X^i_{l,m,2006}\right)} \quad , i \in S_i \quad , j \in S_j \quad , k \in S_k. \tag{12}$$

where $S_i, S_j = \{DEN, FIN, GER, GRE, JPN, POR, ESP, SWE, GBR, USA\}$ and $S_k = \{Debt, Equity, FDI\}$. Explanatory variables included in $X^i_{j,k,2006}$ are six-year (2001-2006) average

value of $r^i_{j,k,y}$, six-year (2001-2006) standard deviation of $r^i_{j,k,y}$ and its square, log of distance between countries i and j, gross domestic product (GDP) of country j in 2006 and some interaction terms.[12] Distance between countries i and j is the great circle distance between the capitals of the two countries.[13] GDP of country j is a proxy variable for stock and bond market size of country j.[14]

In estimating equation(12), I set f^i_{2006} 1 billion U.S.$. The sum of bilateral debt, portfolio equity, and FDI investment positions among ten OECD countries is 3,248 billion U.S.$, 3,149 billion U.S.$, and 2,081 U.S.$, respectively (see Table A2 in the Appendix). That is, the number of f^i_{2006} totals 8,478, and investors are assumed to make their decision 8,478 times to choose an asset of 1 billion U.S.$ from among 27 kinds of international assets (9 countries X 3 assets).

4.2 Base results

Table I summarizes the base results of estimation using equation (12). I consider four sets of explanatory variables, from Equations 1 to 4, and in each equation three sets of nominal income yields $r^i_{j,k,y}$, estimated under Case 1 to Case 3 regarding the estimates of variables for ROW, are employed. Summary statistics of explanatory variables over 228,906 observations are reported in Table A3 in the Appendix.

[Insert Table I here]

Equation 1 is the most simple specification. It includes only three explanatory variables: average of nominal income yields, standard deviation of nominal income yields, and the square of the standard deviation. The parameters concerning six-year average of nominal income yields

[12] Admittedly some decisions of international investment are affected from other factors, such as establishing international production network for FDI decision, and diversifying portfolio for equities investment. In this paper, however, I employ explanatory variables which are common to debt, portfolio equity, and FDI, because I cannot see such kinds of investors' idiosyncratic motivation in my dataset.

[13] Stein and Daude (2007) estimated that time zone differences between two countries have a negative effect on their bilateral FDI decision. In this paper, however, I don't use this variable because it highly correlates with distance in this ten-country dataset.

[14] It is considered that the market size of asset k in country j has a positive effect on $\Pr\left(f^i_{j,k,2006}\right)$, while, on the other hand, the investors' decision on asset allocation also affects stock and bond market sizes in host countries. I employ GDP as a proxy variable for asset market size to correct this endogeneity.

are positive and statistically significant in Cases 1 and 2, which means that high income yields of an asset increase the possibility that foreign investors will purchase it. The significance of the parameters, however, disappears in Case 3. Standard deviation of nominal income yields has negative and statistically significant estimates of parameters in all three cases, which strongly supports the intuition that investors want to avoid uncertainty. The square of standard deviation of nominal income yields has positive and statistically significant estimates in all three cases, which means that the additional negative effect of increasing uncertainty on the probability of asset choice is decreasing.

Equations 2 and 3 include distance and GDP in explanatory variables, in separate terms (Equation 2) and in interaction terms (Equation 3). In Equation 2, the estimates of parameters of average nominal income yields are unstable in Cases 1 - 3, but other explanatory variables have stable and statistically significant estimates. Distance between source and host countries negatively affects the possibility of investing in the host country's asset, while GDP of the host country, a proxy variable for stock and bond market size in the host country, positively affect it. In Equation 3, all parameters associated with six interaction terms have stable and statistically significant estimates in three cases. As for the average of nominal income yields, the greater the distance between source country i and host country j and the larger the GDP of host country j, the more positively investors in source country i are affected by the increase of average income yields in asset k in host country j on the probability of choosing $f^i_{j,k,2006}$. As for standard deviation of nominal income yield and its square, however, indirect effects of distance and GDP on probability of choosing $f^i_{j,k,2006}$ through two standard deviation terms become opposite to each other.

Equation 4 includes all explanatory variables considered in Equations 1 - 3. There are seven explanatory variables whose parameters have the same signs with statistical significance in all three Cases 1 - 3: The square of standard deviation of nominal income yields, distance, GDP, and four interaction terms formed by one of standard deviation of nominal income yields and its square and one of distance and GDP. Parameters of these four interaction terms in Equation 4 have the same sign with statistical significance as in Equation 3. GDP has positive parameters with statistical significance in all six cases in Equations 2 and 4. Log of distance has positive parameters

in Equation 4, but combining it with two interaction terms which contain log of distance and estimating them at about the average value of standard deviation, we can conclude that the sum of direct and indirect effects of distance on the choice of international assets is strongly negative.

Observing the results in Table I, we find five explanatory variables whose parameters are stable and statistically significant in all equations that use them. GDP has positive parameters in all cases in Equations 2 and 4, meaning the size of the stock and bond market in the host country affects the probability of asset choice positively. An interaction term with standard deviation of nominal income yields and distance has negative parameters in all cases in Equations 3 and 4. It means that investors want to avoid uncertainty, and the risk-averse attitude strengthens as the host country gets further away. An interaction term with the square of standard deviation of nominal income yields and distance has, on the other hand, positive and statistically significant parameters in all six cases. It implies that the additional negative effect of increasing uncertainty on the probability of asset choice weakens as the host country gets far away. The effects of GDP on the probability of asset choice through two standard deviation terms are opposite, meaning the negative effect of uncertainty decreases, while the additional negative effect of increasing uncertainty increases, as the host country's GDP becomes larger.

4.3 Robustness check

A tentative conclusion from Table I is that the standard deviation of nominal income yields and its square affects investors' decision on asset choice through interaction terms with distance and GDP. This supports, although indirectly, the appropriateness of the method of decomposing income yields factors proposed in this paper. In this section, I propose other three results of estimation to check robustness.

The first check is to use real income yields. Here I introduce an assumption that relative purchasing power parity (PPP) holds in all pairs of countries, even in the short run.[15] This condition helps us to see the estimated income yields without bothering with the composition of assets that are denominated in various currencies. When the relative PPP holds, investors' decision

[15] This paper does not go so far as to assume that interest parity holds.

making is affected more by real income yields than by nominal income yields. The real income yields source country i gains from $F^i_{j,k,y}$ in year y, $r^{R\ i}_{j,k,y}$ is defined as $r^{R\ i}_{j,k,y} = r^i_{j,k,y} - \pi_{j,y}$, where $\pi_{j,y}$ is the inflation rate in country j in year y. As the real base rate of income yield in host country i in year y, $r^{R\ j}_{j,y} = r^j_{j,y} - \pi_{j,y}$, is introduced, $r^{R\ i}_{j,k,y}$ is written as $r^{R\ i}_{j,k,y} = r^{R\ j}_{j,y} + s^i_{k,y} + t_{j,k,y}$. In this paper, $\pi_{j,y}$ (j = DEN, FIN, GER, GRE, JPN, POR, ESP, SWE, GBR, USA) is calculated from country j's GDP deflators, reported in *International Financial Statistics* published by IMF. Since GDP deflator of ROW is unknown, I suppose $\pi_{ROW,y} = 0$ and therefore $r^{R\ i}_{ROW,k,y} = r^i_{ROW,k,y}$.

[Insert Table II here]

Table II is a counterpart of Table I in the case of real income yields. There are three explanatory variables whose parameters are stable and statistically significant in all equations in which they are included: GDP, an interaction term of standard deviation of nominal income yields and distance, and an interaction term of the square of nominal income yields' standard deviation and distance. GDP has positive parameters in all cases in Equations 2 and 4, same as Table I. Also, interaction terms of standard deviation of nominal income yields and their square with respect to distance still have negative and positive parameters, respectively, in all cases in Equations 3 and 4. The direct effect of GDP and the indirect effects of standard deviation of real income yields and its square through interaction terms with GDP on asset choice are still observed in this case.

The second robustness check is to examine all cases regarding $r^{ROW}_{ROW,y}$, $s^{ROW}_{Debt,y}$, $s^{ROW}_{Equity,y}$, $t_{ROW,Equity,y}$, $u^{ROW}_{FDI,y}$, and $v_{ROW,FDI,y}$. The estimated values of $r^j_{j,y}$, $s^i_{Debt,y}$, $s^i_{Equity,y}$, $t_{j,Equity,y}$, $u^i_{FDI,y}$, and $v_{j,FDI,y}$ depend on those for i, j = ROW, and I consider three values of each ROW variables in Cases 1 to 3. Actually, since one ROW variable has three values, there are 729 ($= 3^6$) possible combinations altogether about the set of values $\{r^{ROW}_{ROW,y},\ s^{ROW}_{Debt,y},\ s^{ROW}_{Equity,y},\ t_{ROW,Equity,y},\ u^{ROW}_{FDI,y},\ v_{ROW,FDI,y}\}$. I estimate Equations 1 to 4 in all 729 cases and classify estimated parameters with respect to their signs and statistical significance into five categories: positive and statistically significant at the one percent level, positive and statistically significant at the five percent level, statistically insignificant at the five percent level, negative and statistically significant at the five percent level, and negative and statistically significant at the one percent level. Results are summarized in Table III. For example, in Equation 1, parameters of six-year average value of nominal income yields are positive

and statistically significant at the one percent level in 614 cases, while they are insignificant at the five percent level in 98 cases. The third robustness check is to use $r_{j,y}^{R\,j}$ instead of $r_{j,y}^{j}$ when considering all 729 cases, and the results are summarized in Table IV.

[Insert Tables III and IV here]

Among 11 explanatory variables, there are three variables whose parameters are statistically significant in all 729 cases in all equations in which they are included in Tables III and IV. GDP has positive and statistically significant parameters in all 729 cases in Equations 2 and 4 in both Tables III and IV. Interaction terms of standard deviation of nominal income yields and their square with respect to distance have negative and positive parameters, respectively, in all 729 cases in Equations 3 and 4 in both Tables III and IV. From these robustness checks, the statement that standard deviation of income yields and its square affects investors' decision on asset choice through interaction terms with distance is strongly supported. This also supports the plausibility of linear algebraic methodology regarding factor decomposition of income yields proposed in this paper.

5 Benefit of international capital transactions

In this section I estimate the benefit of international capital transactions by country and by asset, following the framework developed in Section 2. Based on the basic, neoclassical one-sector macroeconomic model, bilateral capital movements have the following two income effects. First, they increase the income of both net capital importer and exporter. Second, they have symmetric income effects on workers and capitalists in two countries, that is, workers in a net capital importer gain and its capitalists lose, while workers in a net capital exporter lose and its capitalists gain. The framework developed in this paper differs from the basic model in that there are differences of income yields with respect to financial assets, source countries, and host countries, as well as differences between the marginal product of capital and the financial rate of return. Considering this characteristic, we can expect various results from the following counterfactual analysis. It

might happen, for example, that a country which is a net capital importer in total has an investment income surplus and the income of capitalists in that country increases. Or, it might happen not only that both workers and capitalists in a country increase their income, but also that all workers and capitalists in a pair of countries increase their income.

I set $y = 2006$ as a benchmark year and use that year's stock values and parameter as well as six-year average values $\overline{r}_i^i$, $\overline{s}_{Debt}^j$, $\overline{s}_{Equity}^j$, $\overline{t}_{i,Equity}$, $\overline{u}_{FDI}^j$, and $\overline{v}_{i,FDI}$, to calculate country i's benchmark net national income, $BNNI_i$. $BNNI_i$ is defined as follows.

$$BNNI_i = BNDP_{i,2006} + \sum_j \sum_k \overline{r}_{j,k}^i F_{j,k,2006}^i - \sum_j \sum_k \overline{r}_{i,k}^j F_{i,k,2006}^j \quad , \tag{13}$$

where $BNDP_{i,2006} = BA_i \left[\left(L_{i,2006}\right)^{\alpha_{i,2006}} \left(RK_{i,2006} + AIK_i\right)^{1-\alpha_{i,2006}} \right]$ is the benchmark net domestic product function, $BA_i = NDP_{i,2006} / \left(L_{i,2006}\right)^{\alpha_{i,2006}} \left(RK_{i,2006} + AIK_i\right)^{1-\alpha_{i,2006}}$ is the benchmark technology, and AIK_i is the approximate intangible asset. This definition means that BA_i is adjusted to make the value of $BNDP_i$ equal to that of $NDP_{i,2006}$. $L_{i,2006}$ is the number of employees and $RK_{i,2006}$ is the nominal real capital in country i: both are from *OECD Economic Outlook*.[16] From the definition of equation (1), it is appropriate to use $IK_{i,2006}$ instead of AIK_i in equation (13). However, since $IK_{i,2006}$ can be calculated to use $\underline{a}_{i,2006}$, and $\underline{a}_{i,2006}$ and $IK_{i,2006}$ are interdependent from equation (3), $IK_{i,2006}$ cannot be calculated. Therefore, I use the idea of approximate intangible asset, AIK_i, and obtain it the following way. I calculate approximate average $\underline{a}_{i,y}$, $\overline{\underline{aa}}_i$, and approximate average $\underline{b}_{i,k,y}^j$, $\overline{\underline{ab}}_{i,k}^j$, from the following equations, which are similar to equations (3) and (5), respectively:

$$\overline{\underline{aa}}_i = \frac{\overline{r}_i^i}{\frac{(1-\alpha_{i,2006})NDP_{i,2006}}{RK_{i,2006}}} \quad , \tag{14}$$

[16] In this paper, nominal real capital does not include land and natural resources; Caselli and Feyrer (2007) consider them as a part of capital to obtain the remarkable result that the marginal products of capital are actually quite similar across countries. The results of this paper, however, change only marginally even if I take land and natural resources into account as a component of real capital, since it does not change the result of estimating $r_{i,k,y}^j$, that is, the nominal rate of income gain from financial asset $F_{i,k,y}^j$. If I include these natural capital in real capital $RK_{i,y}$, the increase of $RK_{i,y}$ is accompanied by the decrease of $\underline{a}_{i,y}$ in Equation (3) and $\underline{a}_{i,k,y}^j$ in Equation (4) and has little effect on the following analysis.

$$\overline{\underline{ab}}^{j}_{i,k} = \frac{\overline{s}^{j}_{k} + \overline{t}_{i,k}}{\frac{(1-\alpha_{i,2006})NDP_{i,2006}}{RK_{i,2006}}} \quad . \tag{15}$$

Then I use $\overline{\underline{ab}}^{j}_{i,k}$ to calculate AIK_i.

The benefit to country i from trading asset m with foreign countries, $B_{i,m}$, is defined as the difference between $BNNI_i$ and hypothetical net national income $HNNI_{i,-m}$. $HNNI_{i,-m}$ is the estimated income in the case in which source country i withdraws $F^{i}_{j,m,2006}$, $\forall j$, from foreign countries and instead invests it in the domestic market, and also foreign countries withdraw $F^{j}_{i,m,2006}$, $\forall j$, from country i. After the worldwide withdrawal of asset m, real assets and intangible assets in country i change by $\Delta RK(m)_i = \sum_j \overline{\underline{aa}}_i \left(F^{i}_{j,m,2006} - F^{j}_{i,m,2006}\right)$ and $\Delta AIK(m)_i = -\sum_j \overline{\underline{ab}}^{j}_{i,k} F^{j}_{i,m,2006}$, respectively. Formally, $HNNI_{i,-m}$ is defined as

$$HNNI_{i,-m} = HNDP_{i,-m} + \sum_j \sum_{k \neq m} \overline{r}^{i}_{j,k} F^{i}_{j,k,2006} - \sum_j \sum_{k \neq m} \overline{r}^{j}_{i,k} F^{j}_{i,k,2006} \quad ,$$

where

$$HNDP_{i,-m} = BA_i \left[\left(L_{i,2006}\right)^{\alpha_{i,2006}} \left(RK_{i,2006} + AIK_i + \Delta RK(m)_i + \Delta AIK(m)_i\right)^{1-\alpha_{i,2006}} \right] \quad .$$

$B_{i,m}$ is distributed to labor income and capital income of country i with a combination of the change of total wage by $\alpha_{i,2006}\left(BNDP_i - HNDP_{i,-m}\right)$ and the change of total capital income by $\left(1-\alpha_{i,2006}\right)\left(BNDP_i - HNDP_{i,-m}\right) + \sum_j \overline{r}^{i}_{j,m} F^{i}_{j,m,2006} - \sum_j \overline{r}^{j}_{i,m} F^{j}_{i,m,2006}$.

Similarly, the benefit to country i from trading assets with country l, $B_{i,l}$, is defined as $B_{i,l} = BNNI_i - HNNI_{i,-l}$, where $HNNI_{i,-l}$ is the estimated income in the case in which source country i withdraws $F^{i}_{l,k,2006}$, $\forall k$, from host country l and instead invests it in the domestic market and foreign country l withdraws $F^{l}_{i,k,2006}$, $\forall k$, from country i as well. After this reallocation of financial assets between countries i and l, real assets and intangible assets in country i change by $\Delta RK(l)_i = \sum_k \overline{\underline{aa}}_i \left(F^{i}_{l,k,2006} - F^{l}_{i,k,2006}\right)$ and $\Delta AIK(l)_i = -\sum_k \overline{\underline{ab}}^{j}_{i,k} F^{l}_{i,k,2006}$, respectively. Formally, $B_{i,l} = BNNI_i - HNNI_{i,-l}$, and $HNNI_{i,-l}$ is defined as

$$HNNI_{i,-l} = HNDP_{i,-l} + \sum_{j \neq l} \sum_{k} \overline{r}^{i}_{j,k} F^{i}_{j,k,2006} - \sum_{j \neq l} \sum_{k} \overline{r}^{j}_{i,k} F^{j}_{i,k,2006} \quad ,$$

where

$$HNDP_{i,-l} = BA_i \left[\left(L_{i,2006} \right)^{\alpha_{i,2006}} \left(RK_{i,2006} + AIK_{i,2006} + \Delta RK(l)_i + \Delta AIK(l)_i \right)^{1-\alpha_{i,2006}} \right] \quad .$$

$B_{i,l}$ is distributed to labor income and capital income of country i with a combination of the change of total wage by $\alpha_{i,2006} \left(BNDP_i - HNDP_{i,-all} \right)$ and the change of total capital income by $\left(1 - \alpha_{i,2006}\right) \left(BNDP_i - HNDP_{i,-all} \right) + \sum_k \overline{r}^{i}_{l,k} F^{i}_{l,k,2006} - \sum_k \overline{r}^{l}_{i,k} F^{l}_{i,k,2006}$.

I also consider the extreme case that all international financial assets are withdrawn by all source countries. The benefit to country i from the whole international capital transactions, $B_{i,all}$, is defined as $B_{i,all} = BNNI_i - HNDP_{i,-all}$, where

$$HNDP_{i,-all} = BA_i \left[\left(L_{i,2006} \right)^{\alpha_{i,2006}} \left(RK_{i,2006} + \sum_{j} \sum_{k} \underline{\overline{aa}}_i \left(F^{i}_{j,k,2006} - F^{j}_{i,k,2006} \right) \right)^{1-\alpha_{i,2006}} \right] \quad .$$

$B_{i,all}$ is distributed to labor income and capital income in country i with a combination of the change of total wage by $\alpha_{i,2006} \left(BNDP_i - HNDP_{i,-all} \right)$ and the change of total capital income by $BNNI_i - \alpha_{i,2006} BNDP_i - \left(1 - \alpha_{i,2006}\right) HNDP_{i,-all}$.

[Insert Table V here]

Table V summarizes $BNNI_i$, AIK_i, $\overline{r}^{i}_{i}$, $\underline{\overline{aa}}_{i,2006}$, $B_{i,all}/BNNI_i$, and its distribution to labor capital income in Cases 1-3. AIK_i increases from Case 1 to Case 3 in order in all ten countries, mainly because estimated average base rates in host country $\overline{r}^{i}_{i}$ decreases from Case 1 to Case 3 in order, which widens the positive gap $\underline{\overline{ab}}^{j}_{i,k} - \underline{\overline{aa}}_i$. The ratio of the approximate intangible asset in country i, AIK_i, to its real asset, $RK_{i,2006}$, ranges from -0.23% (USA) to 14.98% (DEN) in Case 1, while in Case 3 it ranges from 3.50% (JPN) to 28.16% (SWE). The three highest-ratio countries are Denmark, Sweden, and the U.K. in all three cases.

As for the ratio of benefit of international capital transactions in country i, $B_{i,all}$, to its benchmark net national income, $BNNI_i$, it ranges from -4.07% (ESP) to 2.03% (JPN) in Case 1. In this case, eight countries ($DEN, FIN, GER, GRE, POR, ESP, SWE, USA$) have negative $B_{i,all}/BNNI_i$, which means these countries are estimated to suffer income losses from international capital transactions. In Case 3, however, the range of $B_{i,all}/BNNI_i$ moves upward, extending from -1.46% (ESP) to 4.29% (GBR), and there are only two countries where $B_{i,all}/BNNI_i < 0$ ($i = GER, ESP,$). It is estimated that Japan and the U.K. have a positive effect, while Germany and Spain have a negative effect, on their income from international capital transactions in all three cases. This reflects the fact that income yields of outflow-capital are relatively higher in Japan and the U.K., and lower in Germany and Spain, than those of inflow-capital.

Table V also reports the distribution of $B_{i,all}/BNNI_i$ to labor and capital income. Benefits of both labor and capital incomes increase from Case 1 to Case 3 in order in all ten countries. This comes from the fact that AIK_i increases as three values of income yield components for ROW which determine AIK_i ($s^{ROW}_{Debt,y}$, $s^{ROW}_{Equity,y}$, and $u^{ROW}_{FDI,y}$) increase, and this effect on income through production function $BNDP_{i,2006}$ dominates other effects through balance of investment income in $BNNI_i$. As for the symmetric effects on labor and capital incomes, there are five countries in which changes of labor and capital income show symmetry in Case 1, while there are six countries in Cases 2 and 3. In this setting, symmetric effects on labor and capital incomes are not dominant.[17]

[Insert Table VI here]

Table VI shows $B_{i,m}/BNNI_i$ and $B_{i,l}/BNNI_i$ for ten OECD countries in Cases 1-3. "+ + +" and "- - -" in a table mean that these ratios are more than 1% and less than -1%, respectively. Similarly, "+ +" and "- -" are between 0.1% and 1% and between -0.1% and -1%, respectively, and "+" and "-" are between 0% and 0.1% and between 0% and -0.1%, respectively. As for the benefit

[17] Benefits of labor and capital incomes reported in Table 5 are the distribution of $B_{i,all}/BNNI_i$, not the ratios of increase or decrease of total labor or capital income in country i. By making simple calculation, however, readers can have these figures. Take the U.S. in Case 3 as an example. The national benefit from capital transaction is 0.34%, and -0.21% and 0.56% are distributed to labor and capital income, respectively. Labor income is $\alpha_{i,2006}NDP_{i,2006}$, so the estimated decrease ratio of labor income in the U.S.A. in Case 3 is -0.31%, derived from dividing -0.21% by $\alpha_{USA,2006}NDP_{USA,2006}/BNNI_{USA} = 0.685$. Also, capital income is $BNNI_{i,2006} - \alpha_{i,2006}NDP_{i,2006}$, so the estimated increase ratio of capital income in the U.S.A. is 1.78%, derived from dividing 0.56% by $(BNNI_{i,2006} - \alpha_{i,2006}NDP_{i,2006})/BNNI_{i,2006} = 0.315$.

to country i from trading asset m, $B_{i,m}$, FDI generally increases its income the most compared with debt and portfolio equity, in all cases and in all countries. On the other hand, in the case of debt and portfolio equity, negative values dominate in all cases. This might reflect the fact that investors' primary motivation to purchase foreign debt securities and equities is to diversify portfolio and decrease risk, not to increase their investment income.

As for the benefit to country i from trading assets with country l, $B_{i,l}$, it is interesting to consider a pair $B_{i,l}$ and $B_{l,i}$. If $B_{i,l}$ and $B_{l,i}$ are both positive, it means countries i and l have both benefitted from bilaterally trading assets between them. This is the expected result of capital transactions based on the neoclassical one-sector macroeconomic model. Table VI shows, however, quite different results. Among 45 pairs of 10 OECD countries, there is no both-beneficial pair in Case 1, one pair in Case 2, and three in Case 3. On the other hand, the number of pairs in which one country gains while the other country loses from bilateral capital transactions is 39 in Case 1, 29 in Case 2, and 25 in Case 3. A win-lose result dominates in bilateral capital transactions. It is noteworthy that Japan gains on its income from bilateral asset transactions with all other countries ($B_{JPN,l} > 0$, $\forall l$), while they lose on their income from bilateral asset transactions with Japan ($B_{i,JPN} > 0$, $\forall i$) in all three cases, because of very low rate of return from assets invested in Japan.

[Insert Table VII here]

Table VII shows whether international capital transactions increase or decrease labor and capital incomes, reported by trading partners and by trading assets. Seeing the effect by asset, I find only three cases in which both labor and capital income increase from international debt and portfolio equity transactions (Japan and the U.K. by debt in Case 3 and Japan by equity in Case 3), while there are as many as five countries in which both labor and capital income increase from FDI activities in all Cases 1-3 (Denmark, Finland, Japan, Sweden, and the U.K.). It shows that FDI produces more favorable circumstances for both labor and capital income because of intangible assets transplanted in host country.

On the other hand, by seeing the effect of bilateral international financial transactions, I find that the welfare trade-off between labor and capital incomes in source and host countries, expected

from the basic one-sector macroeconomic model, is dominant. Among 135 pairs of ($B_{i,j}$, $B_{j,i}$) estimation in Cases 1-3 in 10 OECD countries, there are 90 pairs in which source and host countries have this symmetric effects on labor and capital incomes. For example, considering Denmark and Finland, labor income decreases and capital income increases in Denmark by financial transactions with Finland, while labor income increases and capital income decreases in Finland by financial transactions with Denmark, in all Cases 1-3. On the other hand, there is no pair in which both labor and capital income increase in both countries i and j, while there are nine pairs in which both incomes decrease in both countries, such as the pair of Denmark and the U.S.. in Cases 2 and 3. Japanese tend to lose their labor income from financial transactions with OECD countries, while they always gain their capital income, partly because Japan is a net financial capital exporter with respect to bilateral financial transactions. On the other hand, Greece is a net financial capital importer from 10 OECD countries, and that's why Greek labor income generally increases while their capital income generally decreases by bilateral financial transactions.

6 Conclusions

This study illustrates that the return differentials of foreign investment by nationality and by form of capital are worth considering when we observe the welfare effects of international financial transactions. I assume that the difference of income yields by source or host countries reveals the different properties of cross-border investment by nationality of capital. I employ bilateral income yields as a key concept in this paper.

This paper develops three bodies of analysis. First, I examine the bilateral estimation of the income yields on financial assets among 10 OECD countries. There are three kinds of assets: debt, portfolio equity, and FDI. The comparison of the estimated returns of equity and FDI informs us of the advantages of FDI over portfolio investment. I find that Finland, Sweden, the U.K., and the U.S. have large advantages of FDI, which means companies located in these countries have profitable intangible assets.

Second, I employ the estimated income yields as determinants of international capital transac-

tions. I examine whether the income yields, differentiated by financial assets and by host countries, affect investors' decisions on what asset in what country they want to purchase. My analysis shows that the standard deviations of income yields, rather than income yields themselves, have significant effects on investors' choice of country, both directly and indirectly through distance.

Finally, I apply the estimated income yields to clarify the effects of cross-border capital transactions on labor and capital incomes as well as on national income. A neoclassical one-sector macroeconomic model predicts two income effects about international capital movements. First, bilaterally trading assets increase incomes of both trading countries. Second, workers in a net capital importer gain and its capitalists lose, while workers in a net capital exporter lose and its capitalists gain. My analysis shows that the former effect is not dominant, while the latter effect is dominant, in the counterfactual analysis.

Appendix A. Criteria of Country Selection

(1) *Data unavailability for income yields*: I could not obtain some countries' $r^i_{k,y}$ or $r_{j,k,y}$ at year y between 2001 and 2006 because of the lack of figures about these countries' $I^i_{k,y}$, $I_{j,k,y}$, $K^i_{k,y}$, or $K_{j,k,y}$ in BOPS, and therefore I exclude them from the data in all periods. The following are the countries excluded by this criterion and their missing values: Austria ($I^{AUT}_{k,2006}$, $I_{AUT,k,2006}$, $k = Debt, Equity$), Belgium ($I^{BEL}_{k,2001}$, $I_{BEL,k,2001}$, $k = Debt, Equity, FDI$), France ($I^{FRA}_{Debt,y}$, $I_{FRA,Debt,y}$, $y = 2001-2006$), Korea ($I^{KOR}_{Debt,y}$, $I_{KOR,Debt,y}$, $y = 2001-2006$), Luxembourg ($I^{LUX}_{k,2001}$, $I_{LUX,k,2001}$, $K^{LUX}_{k,2001}$, $K_{LUX,k,2001}$, $k = Debt, Equity, FDI$), Mexico ($I^{MEX}_{FDI,y}$, $y = 2001-2003, 2006$; $I^{MEX}_{Equity,y}$, $I_{MEX,Equity,y}$, $K^{MEX}_{Equity,y}$, $I^{MEX}_{Debt,y}$, $y = 2001-2006$), Norway ($I^{NOR}_{Equity,y}$, $I_{NOR,Equity,y}$, $y = 2001-2006$), Slovak Republic ($I^{SVK}_{k,y}$, $I_{SVK,k,y}$, $k = Debt, Equity$, $y = 2001, 2004-2006$; $I^{SVK}_{FDI,2001}$, $I_{SVK,FDI,2001}$), Switzerland ($I^{SUI}_{Debt,y}$, $I_{SUI,Debt,y}$, $y = 2001-2006$), Turkey ($I^{TUR}_{Equity,y}$, $y = 2001-2006$; $I_{TUR,Equity,y}$, $y = 2004, 2006$).

(2) *Implausibly high averages of income yields*: Probably because of biased figures of $I^i_{k,y}$, $I_{j,k,y}$, $K^i_{k,y}$, or $K_{j,k,y}$ reported by institutions and individuals or a consistent error of classification by authorities concerned, there are cases in which $r^i_{k,y}$ or $r_{j,k,y}$ has an implausibly high value. I employ a "ten-percent" criterion to remove doubtful figures. That is, in six types of income yields for country i, $r^i_{k,y}$ and $r_{j,k,y}$, when the six-year average of any $r^i_{k,y}$ or $r_{j,k,y}$, for $y = 2001-2006$, is larger than all of the other five types of six-year average rates of income gains by ten percent. Expressed in a different way, I sort out country i if there exists $r^i_{k,y}$ that satisfies both $\overline{r}^i_k - \overline{r}^i_l > 0.1$ for all $l \neq k$ and $\overline{r}^i_k - \overline{r}_{i,l} > 0.1$ for all l, where $\overline{r}^i_k$ is the arithmetic mean of $r^i_{k,y}$ and $\overline{r}_{i,k}$ is the arithmetic mean of $r_{i,k,y}$, for $y = 2001-2006$. Similarly, country j is taken out if there exists $r_{j,k,y}$ that satisfies both $\overline{r}_{j,k} - \overline{r}_{j,l} > 0.1$ for all $l \neq k$ and $\overline{r}_{j,k} - \overline{r}^j_l > 0.1$ for all l. The following are the countries excluded by this criterion and their implausible figures: Hungary ($\overline{r}^{HUN}_{Debt} = 0.742$), Ireland ($\overline{r}_{IRL,FDI} = 0.198$), Italy ($\overline{r}_{ITA,Equity} = 0.195$), Turkey ($\overline{r}^{TUR}_{Debt} = 1.997$).

(3) *Implausibly high variances of income yields*: In some countries, the standard deviation of $r^i_{k,y}$ or $r_{j,k,y}$ has implausibly high figures, probably because of quite incorrect figures of $I^i_{k,y}$, $I_{j,k,y}$, $K^i_{k,y}$, or $K_{j,k,y}$. I employ a "five-percent" criterion to sort out doubtful figures. That is, if one or more of six type of rates of income gain for country i, $r^i_{k,y}$ and $r_{j,k,y}$ have the standard deviation more than five percent for $y = 2001-2006$, then country i is deleted from the data.

The following are the countries excluded by this criterion and their implausible figures: Czech Republic ($S.D.(r^{CZE}_{FDI}) = 0.063$, $S.D.(r_{CZE,Debt}) = 0.082$), Hungary ($S.D.(r^{HUN}_{Debt}) = 0.263$), Iceland ($S.D.(r_{ISL,FDI}) = 0.101$), Poland ($S.D.(r^{POL}_{Debt}) = 0.102$), Turkey ($S.D.(r^{TUR}_{Debt}) = 1.025$).

(4) *Implausibly large amounts of bilateral stocks among OECD countries*: Some countries' bilateral financial inward stocks from OECD countries or their outward stocks to OECD countries are implausibly large compared with their total inward or outward stock, partly because data of $K^i_{k,y}$, $K_{j,k,y}$, and $K^i_{j,k,y}$ are from three different sources, with possible differing ways of collecting the data. Though all CPIS, DIS, and BOPS may contain some errors, if one country's inward stocks from OECD countries is 50% larger than its total inward stock, or if one country's outward stocks to OECD countries is 50% larger than its total outward stock, it is natural to consider that this country's data credibility is quite below a satisfactory level. The following are the countries excluded by this criterion and their implausible items: Belgium ($K_{BEL,Equity,y}$, $y = 2001 - 2006$), Canada ($K^{CAN}_{Equity,y}$, $y = 2001, 2003 - 2006$; $K_{CAN,Equity,y}$, $y = 2001 - 2006$), Hungary ($K^{HUN}_{FDI,y}$, $y = 2003 - 2005$), Iceland ($K^{ISL}_{Debt,2004}$; $K_{ISL,Equity,y}$, $y = 2001, 2004$; $K^{ISL}_{FDI,y}$, $y = 2004, 2005$), Italy ($K_{ITA,Equity,y}$, $y = 2001 - 2006$), Mexico ($K^{MEX}_{Debt,2003}$), Netherlands ($K_{NED,FDI,y}$, $y = 2001, 2002$), Norway ($K_{NOR,FDI,y}$, $y = 2002, 2003$), Slovak Republic ($K^{SVK}_{Equity,2001}$; $K^{SVK}_{FDI,2005}$), Turkey ($K_{TUR,Equity,2002}$). When 30 OECD countries are considered, I admit that some countries' inward stocks from and outward stocks to OECD countries are larger than their total inward and outward stocks, respectively. Even in this case, though, in my data set composed of ten countries after screening, any country's inward stocks from OECD countries are smaller than its total inward stocks, and any country's outward stocks to OECD countries are smaller than its total outward stocks.

(5) *Excessive amount of missing entries in bilateral stock data among OECD countries*: There are some missing entries in CPIS, DIS, and BOPS, because some data are unavailable and some other data are not disclosed for reasons of confidentiality. In some countries, however, there are so many missing entries in a certain asset and year that it would ruin the credibility of estimation if I were to use the data. I exclude some countries from my data set, therefore, by using the criterion that a country a majority of whose bilateral stock data with 30 OECD countries is

not available is inappropriate for this analysis. The following are the countries excluded by this criterion and their inappropriate items to analyze: Australia ($K^{AUS}_{Debt,y}$, $y = 2002, 2003, 2005, 2006$), Belgium ($K^{BEL}_{FDI,y}$, $K_{BEL,FDI,y}$, $y = 2001, 2002$), Iceland ($K^{ISL}_{Debt,2004}$), Mexico ($K^{MEX}_{Debt,y}$, $K^{MEX}_{Equity,y}$, $y = 2001 - 2006$), New Zealand ($K^{NZL}_{Debt,y}$, $y = 2001 - 2003, 2005, 2006$; $K^{NZL}_{Equity,y}$, $y = 2003, 2005, 2006$), Poland ($K^{POL}_{Debt,2002}$, $K^{POL}_{Equity,2002}$), Switzerland ($K^{SUI}_{Debt,y}$, $K^{SUI}_{Equity,y}$, $y = 2004, 2005$), Turkey ($K^{TUR}_{Debt,y}$, $y = 2001 - 2003, 2005$; $K^{TUR}_{Equity,y}$, $y = 2001 - 2005$).

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Figure I. Average income yields: 2001–2006

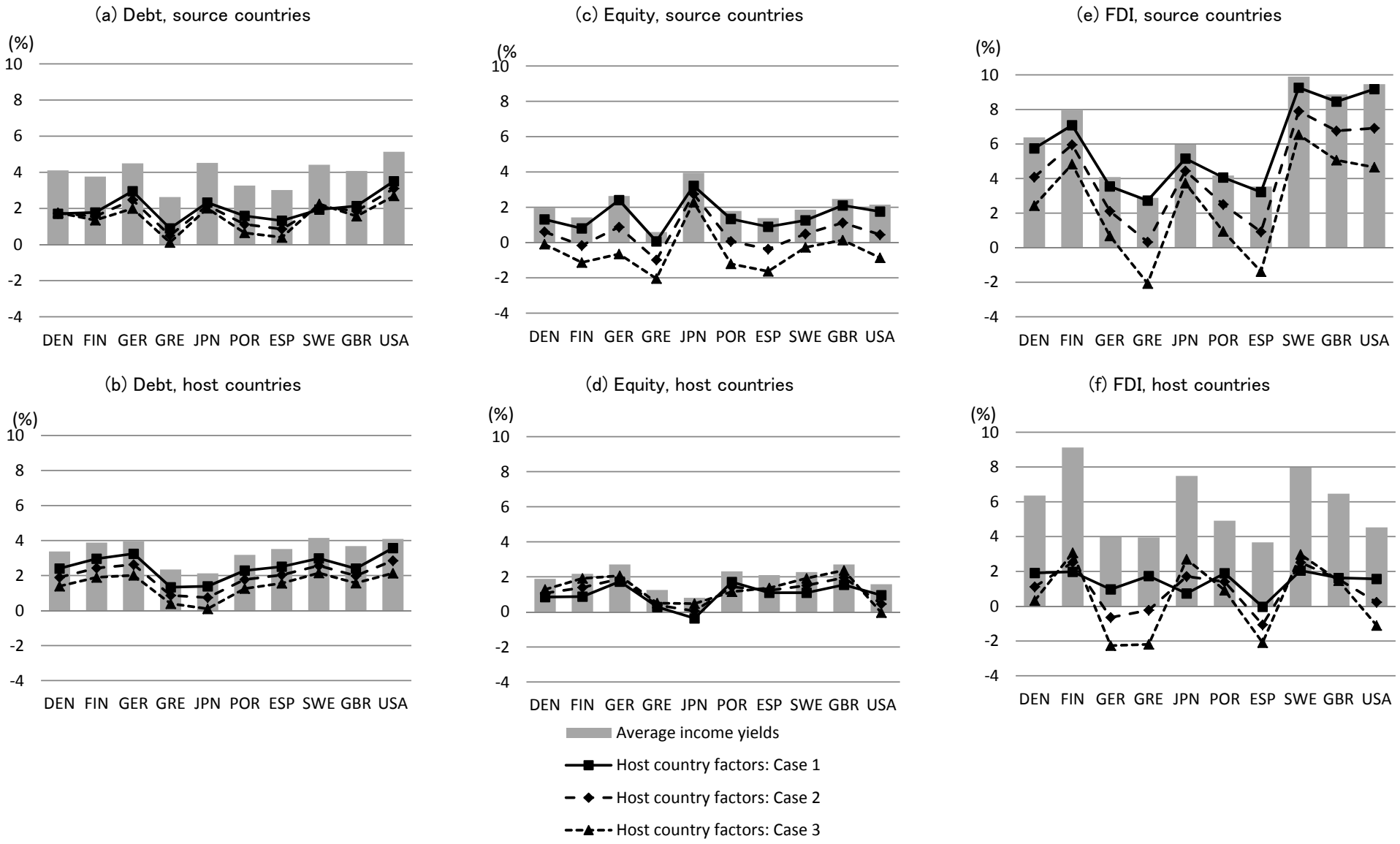

Figure II. Six components of income yields in source and host countries

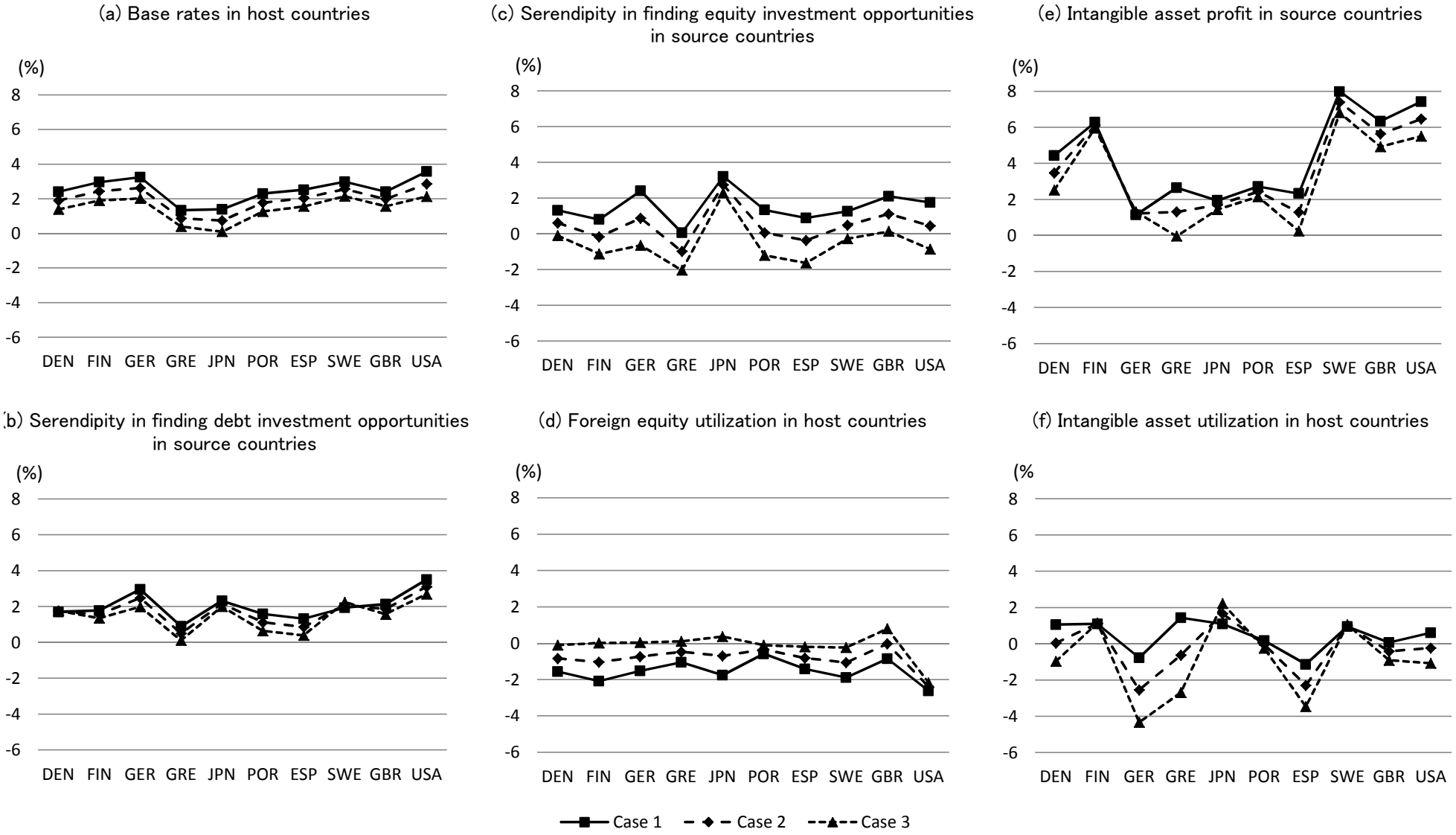

Table I. Estimation results of nominal income yields data

	Equation 1			Equation 2			Equation 3			Equation 4		
	Case 1	Case 2	Case 3	Case 1	Case 2	Case 3	Case 1	Case 2	Case 3	Case 1	Case 2	Case 3
Average of nominal income yields (IY)	0.103**	0.049**	−0.008	−0.017*	0.021**	0.037**	−0.076**	−0.005	0.047**	−0.023	0.054**	0.097**
	(0.008)	(0.008)	(0.007)	(0.008)	(0.008)	(0.007)	(0.014)	(0.014)	(0.012)	(0.014)	(0.014)	(0.012)
Standard deviation (SD) of nominal IY	−2.145**	−1.520**	−1.188**	−0.723**	−0.907**	−0.924**	−0.125	−0.733**	−1.163**	1.505**	0.733**	0.183
	(0.074)	(0.062)	(0.047)	(0.077)	(0.067)	(0.050)	(0.120)	(0.095)	(0.068)	(0.145)	(0.124)	(0.103)
Square of nominal IY SD	0.529**	0.366**	0.263**	0.163**	0.196**	0.191**	0.022	0.151**	0.237**	−0.438**	−0.234**	−0.074**
	(0.019)	(0.016)	(0.012)	(0.019)	(0.017)	(0.013)	(0.031)	(0.024)	(0.017)	(0.039)	(0.034)	(0.027)
Log of distance				−0.767**	−0.748**	−0.740**				0.147**	0.141**	0.142**
				(0.024)	(0.025)	(0.025)				(0.046)	(0.044)	(0.043)
GDP				0.267**	0.264**	0.264**				0.191**	0.178**	0.157**
				(0.004)	(0.004)	(0.004)				(0.007)	(0.007)	(0.006)
Average of nominal IY X log of distance							0.035**	0.043**	0.028**	0.006	0.004	−0.004
							(0.010)	(0.009)	(0.008)	(0.009)	(0.009)	(0.008)
SD of nominal IY X log of distance							−1.591**	−1.518**	−1.322**	−1.634**	−1.537**	−1.400**
							(0.083)	(0.070)	(0.049)	(0.099)	(0.089)	(0.072)
Square of nominal IY SD X log of distance							0.426**	0.381**	0.306**	0.413**	0.369**	0.312**
							(0.022)	(0.019)	(0.013)	(0.027)	(0.025)	(0.020)
Average of nominal IY X GDP							0.024**	0.013**	0.006**	0.009**	0.004*	0.002
							(0.002)	(0.002)	(0.001)	(0.002)	(0.002)	(0.001)
SD of nominal IY X GDP							0.190**	0.301**	0.356**	0.045**	0.114**	0.164**
							(0.015)	(0.012)	(0.009)	(0.017)	(0.015)	(0.012)
Square of nominal IY SD X GDP							−0.057**	−0.075**	−0.081**	−0.010*	−0.024*	−0.034**
							(0.004)	(0.003)	(0.003)	(0.005)	(0.004)	(0.003)
Log likelihood	−27,380	−27,488	−27,446	−23,779	−23,777	−23,738	−23,920	−23,945	−23,805	−23,378	−23,369	−23,291
Pseudo R2	0.02	0.02	0.02	0.15	0.15	0.15	0.14	0.14	0.15	0.16	0.16	0.17

Notes: * and ** signify statistical significance at the 5 and 1 percent level, respectively. Standard errors are in parentheses.

Table II. Estimation results of real income yields data

	Equation 1			Equation 2			Equation 3			Equation 4		
	Case 1	Case 2	Case 3	Case 1	Case 2	Case 3	Case 1	Case 2	Case 3	Case 1	Case 2	Case 3
Average of real income yields (IY)	0.020**	−0.005	−0.021**	−0.003	0.016**	0.025**	−0.012	0.012	0.028**	−0.030**	0.002	0.027**
	(0.005)	(0.005)	(0.004)	(0.005)	(0.005)	(0.005)	(0.010)	(0.010)	(0.009)	(0.011)	(0.010)	(0.010)
Standard deviation (SD) of real IY	−0.936**	−0.649**	−0.596**	−0.816**	−0.909**	−0.951**	−0.567**	−0.697**	−0.827**	1.114**	0.745**	0.298**
	(0.056)	(0.052)	(0.047)	(0.061)	(0.056)	(0.049)	(0.080)	(0.070)	(0.060)	(0.116)	(0.110)	(0.099)
Square of real IY SD	0.191**	0.116**	0.094**	0.175**	0.187**	0.186**	0.111**	0.134**	0.158**	−0.315**	−0.217**	−0.094**
	(0.016)	(0.014)	(0.012)	(0.017)	(0.015)	(0.012)	(0.022)	(0.019)	(0.015)	(0.032)	(0.030)	(0.025)
Log of distance				−0.716**	−0.709**	−0.713**				0.003	0.016	0.022
				(0.024)	(0.024)	(0.024)				(0.047)	(0.045)	(0.045)
GDP				0.267**	0.268**	0.271**				0.260**	0.242**	0.214**
				(0.004)	(0.004)	(0.004)				(0.009)	(0.009)	(0.009)
Average of real IY X log of distance							0.031**	0.030**	0.019**	−0.001	0.001	−0.002
							(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
SD of real IY X log of distance							−1.332**	−1.296**	−1.191**	−1.178**	−1.186**	−1.142**
							(0.046)	(0.042)	(0.036)	(0.072)	(0.070)	(0.064)
Square of real IY SD X log of distance							0.334**	0.311**	0.265**	0.287**	0.277**	0.248**
							(0.014)	(0.013)	(0.011)	(0.021)	(0.020)	(0.017)
Average of real IY X GDP							−0.005**	−0.004**	−0.001	0.011**	0.008**	0.007**
							(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
SD of real IY X GDP							0.375**	0.373**	0.364**	−0.035*	0.017	0.076**
							(0.007)	(0.006)	(0.005)	(0.015)	(0.014)	(0.012)
Square of real IY SD X GDP							−0.092**	−0.089**	−0.084**	0.011**	−0.000	−0.012**
							(0.002)	(0.002)	(0.002)	(0.004)	(0.004)	(0.003)
Log likelihood	−27,658	−27,702	−27,668	−23,789	−23,774	−23,729	−24,057	−23,968	−23,828	−23,485	−23,467	−23,418
Pseudo R2	0.01	0.01	0.01	0.15	0.15	0.15	0.14	0.14	0.15	0.16	0.16	0.16

Notes: * and ** signify statistical significance at the 5 and 1 percent level, respectively. Standard errors are in parentheses.

Table III. Classification of estimated parameters: nominal income yields data

	Equation 1					Equation 2					Equation 3					Equation 4				
	+ **	+ *	insgnf.	− *	− **	+ **	+ *	insgnf.	− *	− **	+ **	+ *	insgnf.	− *	− **	+ **	+ *	insgnf.	− *	− **
Average of nominal IY	614	14	98	2	1	350	58	265	18	38	122	42	312	67	186	502	46	174	5	2
SD of nominal IY	0	0	0	0	729	0	0	0	0	729	0	0	72	22	635	667	27	35	0	0
Square of nominal IY SD	729	0	0	0	0	729	0	0	0	0	592	47	90	0	0	0	0	6	17	706
Log of distance						0	0	0	0	729						577	124	28	0	0
GDP						729	0	0	0	0						729	0	0	0	0
Average of nominal IY X log of distance											605	60	64	0	0	5	40	631	31	22
SD of nominal IY X log of distance											0	0	0	0	729	0	0	0	0	729
Square of nominal IY SD X log of distance											729	0	0	0	0	729	0	0	0	0
Average of nominal IY X GDP											658	19	50	1	1	307	181	241	0	0
SD of nominal IY X GDP											729	0	0	0	0	729	0	0	0	0
Square of nominal IY SD X GDP											0	0	0	0	729	0	0	9	18	702

Notes: * and ** signify statistical significance at the 5 and 1 percent level, respectively.

Table IV. Classification of estimated oefficients: real IE data

	Equation 1					Equation 2					Equation 3					Equation 4				
	+ **	+ *	insgnf.	− *	− **	+ **	+ *	insgnf.	− *	− **	+ **	+ *	insgnf.	− *	− **	+ **	+ *	insgnf.	− *	− **
Average of real IY	13	25	493	83	115	431	59	239	0	0	150	81	472	18	8	37	52	575	33	32
SD of real IY	0	0	0	0	729	0	0	0	0	729	0	0	0	0	729	729	0	0	0	0
Square of real IY SD	729	0	0	0	0	729	0	0	0	0	729	0	0	0	0	0	0	0	0	729
Log of distance						0	0	0	0	729						0	13	716	0	0
GDP						729	0	0	0	0						729	0	0	0	0
Average of real IY X log of distance											683	19	27	0	0	6	21	692	9	1
SD of real IY X log of distance											0	0	0	0	729	0	0	0	0	729
Square of real IY SD X log of distance											729	0	0	0	0	729	0	0	0	0
Average of real IY X GDP											36	24	202	40	427	729	0	0	0	0
SD of real IY X GDP											729	0	0	0	0	191	74	460	4	0
Square of real IY SD X GDP											0	0	0	0	729	1	19	625	50	34

Notes: * and ** signify statistical significance at the 5 and 1 percent level, respectively.

Table V: Benefit from international capital transactions

Country	Denmark	Finland	Germany	Greece	Japan	Portugal	Spain	Sweden	UK	USA
$NDP_{i,2006}$ (million US$; 2006) (A)	188,945	153,017	2,163,668	210,018	3,061,997	135,880	902,964	285,449	1,867,260	10,791,000
$\alpha_{i,2006}$ (B)	77.59%	66.14%	66.66%	42.60%	73.75%	71.81%	64.46%	73.94%	70.50%	68.95%
$(1-\alpha_{i,2006})$ (C)	22.41%	33.86%	33.34%	57.40%	26.25%	28.19%	35.54%	26.06%	29.50%	31.05%
$L_{i,2006}$ (thousands; 2006) (D)	2,627	2,157	34,630	3,022	55,740	4,209	17,167	4,171	25,046	136,089
Wage (US$; A*B/D)	55,804	46,924	41,650	29,602	40,511	23,182	33,904	50,611	52,562	54,673
$RK_{i,2006}$ (million US$; 2006) (E)	302,548	201,159	3,384,004	195,644	8,195,207	430,770	1,310,917	397,858	2,171,668	11,335,153
Return of RK (%; A*C/E) (F)	14.00%	25.75%	21.32%	61.62%	9.81%	8.89%	24.48%	18.69%	25.36%	29.56%
[Case 1]										
$BNNI_i$ (million US$)	189,481	152,041	2,172,821	206,359	3,162,660	133,410	882,715	291,185	1,932,308	10,858,365
AIK_i (million US$)	45,311	13,886	44,650	4,024	15,841	32,568	53,683	51,074	241,249	−26,225
average r^i_i (%) (H)	2.41%	2.96%	3.25%	1.33%	1.39%	2.29%	2.51%	2.99%	2.40%	3.57%
average aa_i (H/F)	0.17	0.12	0.15	0.02	0.14	0.26	0.10	0.16	0.09	0.12
Benefit from capital transaction	−0.93%	−3.96%	−3.80%	−1.30%	2.03%	−3.23%	−4.07%	−0.96%	1.15%	−2.30%
Benefit of labor income	−0.94%	−2.20%	−2.81%	0.20%	−0.85%	−0.99%	−1.15%	−2.16%	−1.56%	−2.01%
Benefit of capital income	0.01%	−1.77%	−0.98%	−1.50%	2.88%	−2.24%	−2.93%	1.21%	2.71%	−0.29%
[Case 2]										
$BNNI_i$ (million US$)	189,224	152,079	2,172,462	205,968	3,163,751	133,011	881,202	289,959	1,922,845	10,860,249
AIK_i (million US$)	56,486	22,858	153,243	6,821	151,521	52,499	87,563	81,558	346,295	249,557
average r^i_i (%) (H)	1.90%	2.43%	2.63%	0.87%	0.75%	1.78%	2.04%	2.57%	1.99%	2.86%
average aa_i (H/F)	0.14	0.09	0.12	0.01	0.08	0.20	0.08	0.14	0.08	0.10
Benefit from capital transaction	0.49%	−1.56%	−1.90%	−0.44%	3.03%	−1.58%	−2.75%	1.10%	2.75%	−0.96%
Benefit of labor income	0.27%	−0.63%	−1.54%	0.65%	−0.14%	0.42%	−0.18%	−0.34%	−0.10%	−1.10%
Benefit of capital income	0.22%	−0.94%	−0.36%	−1.09%	3.17%	−1.99%	−2.57%	1.44%	2.85%	0.14%
[Case 3]										
$BNNI_i$ (million US$)	188,968	152,116	2,172,104	205,576	3,164,842	132,611	879,689	288,732	1,913,381	10,862,132
AIK_i (million US$)	67,661	31,830	261,837	9,617	287,201	72,431	121,444	112,042	451,341	525,338
average r^i_i (%) (H)	1.39%	1.90%	2.02%	0.40%	0.10%	0.13%	0.16%	2.15%	1.57%	2.14%
average aa_i (H/F)	0.10	0.07	0.09	0.01	0.01	0.14	0.06	0.11	0.06	0.07
Benefit from capital transaction	1.91%	0.75%	−0.05%	0.41%	4.03%	0.02%	−1.46%	3.04%	4.29%	0.34%
Benefit of labor income	1.47%	0.89%	−0.29%	1.09%	0.58%	1.79%	0.76%	1.41%	1.33%	−0.21%
Benefit of capital income	0.44%	−0.14%	0.24%	−0.69%	3.45%	−1.76%	−2.23%	1.63%	2.97%	0.56%

Table VI: Benefit by country and by asset

Country	Denmark	Finland	Germany	Greece	Japan	Portugal	Spain	Sweden	UK	USA
[Case 1]										
Benefit by asset										
Debt	− − −	− − −	− − −	− −	+ + +	− − −	− − −	− − −	− −	− − −
Equity	− −	− − −	− − −	− −	− −	− − −	− − −	− − −	− − −	− − −
FDI	+ + +	+ + +	− −	− −	+ +	− −	− −	+ + +	+ + +	+ +
Benefit by country										
Denmark		−	−	−	+	−	−	+ +	+	−
Finland	+		−	−	+	−	−	+ +	+	−
Germany	+ +	+		− −	+ +	− −	− −	− −	−	−
Greece	+	+	+		+	+	−	−	−	−
Japan	− −	− −	− −	−		−	− −	− −	− −	− −
Portugal	+	+	−	−	+		+	−	+	−
Spain	+	+	+	−	+	− −		+ +	+ +	+
Sweden	−	− −	−	−	+	+	−		+ +	−
UK	−	− −	−	+ +	+ +	− −	− −	− −		−
USA	+	− −	− −	−	+ + +	+	− −	− −	+ +	
ROW	− − −	− − −	− − −	− − −	+ +	− − −	− − −	−	+ +	− − −
[Case 2]										
Benefit by asset										
Debt	− −	− − −	− − −	− −	+ + +	− −	− − −	− − −	+	− − −
Equity	− −	− − −	− −	− −	+ +	− −	− −	− − −	− − −	− −
FDI	+ + +	+ + +	−	+	+ +	− −	− −	+ + +	+ + +	+ + +
Benefit by country										
Denmark		−	−	−	+	−	−	+ +	+	−
Finland	+		−	−	+	−	−	+ +	+	−
Germany	+ +	−		−	+ +	−	− −	−	−	−
Greece	+	+	+		+	+	−	−	−	−
Japan	− −	− −	− −	−		−	−	− −	− −	− −
Portugal	+	+	−	−	+		−	−	+	−
Spain	+	+	+	−	+	− −		+ +	+	−
Sweden	+	−	−	−	+	+	−		+ +	−
UK	−	− −	−	+ +	+ +	− −	− −	− −		−
USA	− −	− −	− −	−	+ + +	−	− −	− −	− −	
ROW	+ +	−	− − −	− −	+ + +	− −	− − −	+ + +	+ + +	− −
[Case 3]										
Benefit by asset										
Debt	+ +	− −	− −	+ +	+ + +	+ +	− −	− − −	+ +	− −
Equity	+ +	− − −	− −	− −	+ +	− −	− −	− − −	− −	− −
FDI	+ + +	+ + +	+ +	+ +	+ +	−	+	+ + +	+ + +	+ + +
Benefit by country										
Denmark		−	−	−	+	−	−	+ +	+	−
Finland	+		−	−	+	−	−	+ +	+	−
Germany	+ +	−		−	+ +	−	− −	−	−	−
Greece	+	−	−		+	−	−	−	−	−
Japan	− −	− −	− −	−		−	−	− −	− −	− −
Portugal	+	+	−	−	+		− −	−	+	−
Spain	+	+	+	−	+	− −		+	+	−
Sweden	+ +	+	−	−	+	+	−		+ +	+
UK	+	− −	−	+ +	+ +	− −	− −	− −		−
USA	− −	− −	− −	−	+ + +	−	− −	− − −	− −	
ROW	+ + +	+ + +	+ +	+ +	+ + +	+ +	+ +	+ + +	+ + +	+ +

Note: "+ + +" is more than 1%, "+ +" is between 1% and 0.1%, "+" is between 0.1% and 0%,
"−" is between 0% and −0.1%, "− −" is between −0.1% and −1%, "− − −" is less than −1%.

Table VII: Benefit of labor income and capital income by country and by asset

Change of labor income and capital income in:		Denmark	Finland	Germany	Greece	Japan	Portugal	Spain	Sweden	UK	USA
by asset	Debt										
	Equity										
	FDI										
by partner country	Denmark	-----									
	Finland		-----								
	Germany			-----							
	Greece				-----						
	Japan					-----					
	Portugal						-----				
	Spain							-----			
	Sweden								-----		
	UK									-----	
	USA										-----
	ROW										

Note:

		Country	
		labor income	capital income
asset / partner country	Case 1		
	Case 2		
	Case 3		

means this category of income increases, while
means this category of income decreases
by financial transaction of an asset
or between a partner country in each case.

Table A1. Nominal income yields from foreign debt investment, foreign portfolio equity investment, and FDI

(a) Income yields of debt source country i gains ($r^{i}_{Debt,y}$)

Source country i	2001	2002	2003	2004	2005	2006	Ave.	S. D.
DEN	4.31%	4.09%	3.44%	4.11%	4.56%	4.16%	4.11%	0.34%
FIN	4.32%	3.60%	3.54%	3.64%	3.96%	3.53%	3.76%	0.29%
GER	5.58%	4.71%	4.51%	4.01%	4.23%	3.93%	4.50%	0.56%
GRE	2.29%	1.20%	3.89%	3.34%	2.70%	2.38%	2.63%	0.85%
JPN	5.26%	4.39%	4.05%	4.11%	4.49%	4.83%	4.52%	0.42%
POR	4.33%	3.38%	2.45%	2.57%	2.75%	4.15%	3.27%	0.75%
ESP	3.64%	3.26%	2.63%	2.89%	2.81%	2.92%	3.02%	0.33%
SWE	6.10%	4.46%	4.24%	3.88%	4.13%	3.70%	4.42%	0.79%
GBR	4.66%	3.80%	3.60%	3.79%	4.51%	4.11%	4.08%	0.39%
USA	6.20%	5.82%	4.50%	4.37%	5.05%	4.90%	5.14%	0.67%

(b) Income yields of debt host country j pays ($r_{j,Debt,y}$)

Host country j	2001	2002	2003	2004	2005	2006	Ave.	S. D.
DEN	4.23%	3.24%	3.13%	2.80%	3.54%	3.34%	3.38%	0.44%
FIN	4.99%	3.77%	4.06%	3.19%	3.77%	3.53%	3.89%	0.56%
GER	5.35%	4.15%	3.96%	3.41%	3.54%	3.31%	3.95%	0.69%
GRE	0.21%	0.42%	3.12%	2.98%	3.68%	3.68%	2.35%	1.46%
JPN	3.16%	2.72%	2.18%	1.61%	1.68%	1.43%	2.13%	0.63%
POR	3.84%	3.36%	2.68%	2.76%	2.60%	3.85%	3.18%	0.53%
ESP	4.61%	3.56%	3.45%	2.94%	3.35%	3.19%	3.52%	0.53%
SWE	5.04%	4.34%	3.94%	3.66%	3.84%	4.13%	4.16%	0.45%
GBR	4.93%	3.47%	2.96%	3.25%	3.84%	3.66%	3.68%	0.62%
USA	4.86%	4.20%	3.71%	3.52%	3.98%	4.29%	4.09%	0.43%

(c) Income yields of portfolio equity source country i gains ($r^{i}_{Equity,y}$)

Source country i	2001	2002	2003	2004	2005	2006	Ave.	S. D.
DEN	1.61%	2.09%	1.20%	1.87%	1.96%	3.13%	1.98%	0.59%
FIN	1.06%	1.23%	1.16%	1.66%	1.78%	1.65%	1.43%	0.28%
GER	2.84%	3.17%	2.40%	2.72%	2.48%	2.23%	2.64%	0.31%
GRE	0.55%	0.99%	0.53%	0.53%	0.64%	0.38%	0.60%	0.19%
JPN	3.19%	4.01%	3.74%	3.76%	4.56%	4.45%	3.95%	0.46%
POR	1.92%	1.86%	1.68%	1.43%	1.35%	2.52%	1.79%	0.39%
ESP	1.15%	2.07%	1.05%	1.34%	1.41%	1.31%	1.39%	0.33%
SWE	1.53%	1.63%	1.83%	1.81%	2.16%	2.23%	1.87%	0.25%
GBR	2.42%	3.20%	2.55%	2.33%	2.25%	2.09%	2.47%	0.35%
USA	2.12%	2.78%	2.00%	2.11%	1.95%	1.95%	2.15%	0.29%

(d) Income yields of portfolio equity host country j pays ($r_{j,Equity,y}$)

Host country j	2001	2002	2003	2004	2005	2006	Ave.	S. D.
DEN	1.47%	1.83%	1.54%	1.42%	2.44%	2.62%	1.89%	0.48%
FIN	1.30%	1.85%	1.98%	2.45%	2.98%	2.48%	2.17%	0.54%
GER	2.49%	3.19%	2.56%	2.62%	2.65%	2.73%	2.71%	0.23%
GRE	0.87%	0.75%	1.15%	1.19%	1.92%	1.66%	1.25%	0.41%
JPN	0.70%	0.73%	0.61%	0.81%	0.88%	1.11%	0.81%	0.16%
POR	2.76%	2.01%	1.66%	1.79%	2.62%	3.07%	2.32%	0.52%
ESP	2.08%	2.17%	1.90%	1.66%	2.31%	2.47%	2.10%	0.27%
SWE	2.15%	2.36%	2.09%	2.06%	2.57%	2.41%	2.27%	0.19%
GBR	2.46%	3.19%	2.55%	2.52%	2.98%	2.54%	2.71%	0.28%
USA	1.34%	1.76%	1.39%	1.74%	1.65%	1.61%	1.58%	0.16%

(e) Income yields of FDI source country i gains ($r^{i}_{FDI,y}$)

Source country i	2001	2002	2003	2004	2005	2006	Ave.	S. D.
DEN	5.26%	2.85%	4.42%	3.73%	12.21%	9.86%	6.39%	3.43%
FIN	8.93%	7.02%	6.02%	7.61%	8.61%	9.79%	8.00%	1.26%
GER	0.73%	1.40%	2.43%	6.33%	6.99%	6.69%	4.09%	2.63%
GRE	0.63%	0.74%	3.90%	4.19%	4.83%	3.04%	2.89%	1.64%
JPN	5.60%	5.49%	3.91%	5.12%	7.86%	7.81%	5.96%	1.43%
POR	2.90%	1.14%	3.80%	4.38%	6.60%	6.24%	4.18%	1.88%
ESP	2.45%	2.54%	3.42%	3.50%	4.25%	5.10%	3.55%	0.93%
SWE	8.55%	8.19%	8.11%	9.71%	12.27%	12.58%	9.90%	1.86%
GBR	7.52%	7.54%	7.30%	8.88%	11.14%	10.82%	8.87%	1.58%
USA	7.60%	7.80%	9.07%	10.03%	11.11%	11.19%	9.47%	1.44%

(f) Income yields of FDI host country j pays ($r_{j,FDI,y}$)

Host country j	2001	2002	2003	2004	2005	2006	Ave.	S. D.
DEN	5.64%	4.81%	4.40%	4.32%	11.18%	7.81%	6.36%	2.46%
FIN	11.47%	8.12%	8.58%	8.57%	8.85%	9.15%	9.12%	1.09%
GER	1.06%	3.67%	3.86%	3.70%	5.84%	5.80%	3.99%	1.61%
GRE	1.73%	2.36%	5.43%	4.59%	5.81%	3.80%	3.95%	1.50%
JPN	8.19%	6.81%	5.62%	6.54%	9.40%	8.37%	7.49%	1.28%
POR	5.36%	2.38%	3.51%	4.33%	6.86%	7.05%	4.91%	1.70%
ESP	4.02%	3.36%	2.68%	3.31%	4.18%	4.50%	3.67%	0.61%
SWE	7.54%	5.54%	5.63%	7.68%	12.91%	8.49%	7.97%	2.46%
GBR	5.86%	4.37%	5.65%	6.89%	7.52%	8.49%	6.47%	1.34%
USA	0.84%	2.88%	4.66%	5.72%	6.37%	6.71%	4.53%	2.08%

Table A2. Stock of international investment in 2006 (Billion US$)

(a) Debt

		Host country j											$(F^{i}_{ROW,Debt,2006})$	$(F^{i}_{Debt,2006})$
		DEN	FIN	GER	GRE	JPN	POR	ESP	SWE	GBR	USA	OECD10	ROW	Total
Source country i		$(F^{i}_{j,Debt,2006})$												
	DEN		3	29	1	0	0	5	11	7	17	73	45	118
	FIN	4		23	3	0	1	11	11	7	5	65	53	118
	GER	20	17		36	9	23	200	19	110	108	542	741	1,283
	GRE	0	0	8		0	0	1	0	24	4	37	38	75
	JPN	10	5	158	6		2	26	20	93	573	893	940	1,833
	POR	1	0	16	2	0		8	1	9	8	45	76	121
	ESP	1	2	57	4	0	4		3	57	40	168	323	491
	SWE	12	7	18	1	1	0	6		19	28	92	42	134
	GBR	17	10	70	8	58	6	69	19		476	733	1,041	1,774
	USA	13	4	68	2	42	1	25	43	402		600	1,059	1,659
	OECD10	78	48	447	63	110	37	351	127	728	1,259	3,248	4,358	7,606
$(F^{ROW}_{j,Debt,2006})$	ROW	109	87	1,454	133	398	93	596	142	1,084	4,793	8,889		
$(F_{j,Debt,2006})$	Total	187	135	1,901	196	508	130	947	269	1,812	6,052	12,137		

(b) Portfolio equity

		Host country j											$(F^{i}_{ROW,Equity,2006})$	$(F^{i}_{Equity,2006})$
		DEN	FIN	GER	GRE	JPN	POR	ESP	SWE	GBR	USA	OECD10	ROW	Total
Source country i		$(F^{i}_{j,Equity,2006})$												
	DEN		2	9	0	11	0	2	10	16	32	82	49	131
	FIN	1		4	0	4	0	1	14	10	11	45	51	96
	GER	1	7		2	20	0	16	5	38	71	160	805	965
	GRE	0	0	0		0	0	0	0	2	4	6	7	13
	JPN	1	3	16	1		0	8	5	52	224	310	200	510
	POR	0	0	2	0	0		5	0	3	2	12	27	39
	ESP	0	1	13	0	2	4		1	9	12	42	133	175
	SWE	4	13	11	1	14	0	3		29	65	140	120	260
	GBR	7	14	74	7	174	5	31	19		341	672	694	1,366
	USA	21	56	220	14	544	6	86	59	674		1,680	2,649	4,329
	OECD10	35	96	349	25	769	15	152	113	833	762	3,149	4,735	7,884
$(F^{ROW}_{j,Equity,2006})$	ROW	28	59	293	35	486	49	172	96	694	2,030	3,942		
$(F_{j,Equity,2006})$	Total	63	155	642	60	1,255	64	324	209	1,527	2,792	7,091		

(c) FDI

		Host country j											$(F^{i}_{ROW,FDI,2006})$	$(F^{i}_{FDI,2006})$
		DEN	FIN	GER	GRE	JPN	POR	ESP	SWE	GBR	USA	OECD10	ROW	Total
Source country i		$(F^{i}_{j,FDI,2006})$												
	DEN		4	15	0	1	4	2	16	14	12	68	59	127
	FIN	1		8	0	0	0	1	25	2	7	44	51	95
	GER	6	3		1	5	0	27	0	96	203	341	684	1,025
	GRE	0	0	0		0	0	0	0	0	1	1	21	22
	JPN	0	0	7	0		0	2	2	30	184	225	225	450
	POR	2	0	0	0	0		19	0	0	0	21	33	54
	ESP	2	1	20	1	1	28		2	72	25	152	365	517
	SWE	25	38	0	0	1	0	8		0	22	94	168	262
	GBR	14	3	34	2	5	6	68	35		333	500	940	1,440
	USA	8	2	99	2	67	3	61	36	357		635	2,301	2,936
	OECD10	58	51	183	6	80	41	188	116	571	787	2,081	4,847	6,928
$(F^{ROW}_{j,FDI,2006})$	ROW	55	17	567	35	28	47	255	110	562	1,365	3,041		
$(F_{j,FDI,2006})$	Total	113	68	750	41	108	88	443	226	1,133	2,152	5,122		

Table A3. Summary statistics of explanatory variables

Variables	Mean	S. D.	Min	Max
Average of nominal income yields: Case 1	5.615	2.773	−0.289	11.239
Standard deviation of nominal income yields: Case 1	1.125	0.848	0.124	4.106
Average of nominal income yields: Case 2	4.295	2.341	−0.925	10.430
Standard deviation of nominal income yields: Case 2	1.148	0.887	0.152	4.521
Average of nominal income yields: Case 3	2.975	2.228	−4.331	9.622
Standard deviation of nominal income yields: Case 3	1.209	0.934	0.079	5.275
Average of real income yields: Case 1	3.537	3.101	−2.967	11.247
Standard deviation of real income yields: Case 1	1.222	0.849	0.161	4.292
Average of real income yields: Case 2	2.217	2.827	−4.866	10.871
Standard deviation of real income yields: Case 2	1.236	0.887	0.203	4.727
Average of real income yields: Case 3	0.897	2.840	−8.298	10.495
Standard deviation of real income yields: Case 3	1.286	0.935	0.157	5.462
Log of distance	1.397	0.932	−1.036	2.413
GDP	2.032	3.349	0.172	13.133

Notes: Number of observations is 228,906 (= 8,478 decisions X 27 alternatives)

Table A4. Correlation coefficients between variables in the case of nominal income yields

	1	2	3	4	5	6	7	8
1. Average of nominal income yields: Case 1	1.000							
2. Standard deviation of nominal income yields: Case 1	0.675	1.000						
3. Average of nominal income yields: Case 2	0.949	0.560	1.000					
4. Standard deviation of nominal income yields: Case 2	0.681	0.991	0.571	1.000				
5. Average of nominal income yields: Case 3	0.750	0.336	0.920	0.351	1.000			
6. Standard deviation of nominal income yields: Case 3	0.681	0.968	0.577	0.992	0.364	1.000		
7. Log of distance	0.062	−0.058	0.082	−0.057	0.096	−0.063	1.000	
8. GDP	−0.032	0.003	−0.076	−0.006	−0.119	−0.026	0.263	1.000

Notes: Number of observations is 228,906 (= 8,478 decisions ∗ 27 alternatives)

Table A5. Correlation coefficients between variables in the case of real income yields

	1	2	3	4	5	6	7	8
1. Average of real income yields: Case 1	1.000							
2. Standard deviation of real income yields: Case 1	0.556	1.000						
3. Average of real income yields: Case 2	0.956	0.423	1.000					
4. Standard deviation of real income yields: Case 2	0.561	0.991	0.429	1.000				
5. Average of real income yields: Case 3	0.811	0.234	0.947	0.242	1.000			
6. Standard deviation of real income yields: Case 3	0.565	0.970	0.436	0.993	0.252	1.000		
7. Log of distance	0.127	−0.083	0.147	−0.079	0.153	−0.080	1.000	
8. GDP	0.031	−0.036	0.003	−0.031	−0.028	−0.036	0.263	1.000

Notes: Number of observations is 228,906 (= 8,478 decisions ∗ 27 alternatives)