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Do the ASEAN countries and Taiwan form a common currency area?

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Common currency areas and Asian common currency areas in particular are highly topical and somewhat controversial areas for research. We explore the hypothesis that the members of the Association of Southeast Asian Nations meet necessary conditions for forming a common currency area and whether Taiwan appears a natural member of such an area. We test data on the ASEAN countries and Taiwan for consistency with a common currency area. We produce the first evidence that these five ASEAN countries and the ASEAN countries plus Taiwan meet the microeconomic criteria to form a common currency area.

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1. Introduction

The possibility of forming an Asian Single Currency Area is a long-standing issue, and after the financial crisis in 1997 and the advent of the euro in 1999, the debate on this issue has been increasingly heated.² In his keynote speech delivered at the 24th ACAES (American Committee on Asian

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² For example, see Zhang et al. (2004), Marcelo Sánchez (2006), and Zhang and Sato (2008). Fritz Machlup (1977) credits Eli Heckscher as the first user of the term *economic integration* in its current sense. According to Machlup, such usage first appears in the 1935 English translation of Heckscher's 1931 book *Merkantilism* (*Mercantilism* in English).

Economic Studies) in Beijing, Robert Mundell (2003) mentioned the necessity of a single Asian currency and sketched the possible ways to make it happen.

Mundell's (2003) cautious optimism about an East Asian common currency area is supported by a number of recent developments. First, partially due to fast economic transition in several communist countries to market economies, the trade dependence of member states in this area has deepened. Hence to facilitate trade and to reduce foreign exchange related transaction costs, the demand for a stable exchange rate and a single currency is increasing. Mikic (2009) has shown the stable growth of intra-ASEAN trade in goods. In 1980, the intra-ASEAN trade volume accounted for about 15% of the total trade volume of this regional block, and in 2006 this ratio had increased to about 25%.³

Also, it is interesting to notice a number of recent studies which feature the increasing mobility of labor in East Asia (Hugo, 2005; Sziraczki et al., 2008; Thao, 2009). In Taiwan, for example, the percentage of the foreign labor in her labor force has increased from the 0.03% in year 1991 to 3.22% in year 2009. In Table 1, we present data on the foreign labor ratio in five major East Asian labor import countries.

There are two related additional points to consider. The first is that the findings of Heathcote and Perri (2004) imply that real regional influences may be more important than global influences for the countries under study. The second related point is that the ASEAN countries and Taiwan have various monetary regimes. Korea has a flexible rate with inflation targets; Taiwan uses monetary aggregate targeting, Hong Kong the currency board, and Singapore exchange rate targets. Teo (2009) finds that Taiwan's monetary policy is best described as a money growth rate rule. Thus a desire to reduce country risk on the part of the individual ASEAN countries and Taiwan is further motivation for them to examine financial integration including the possibility of forming a common currency area. Such a development would allow for a more realistic credit market structure, for example, by incorporating balance sheet effects. The importance of the interaction of asset prices, collateral values and balance sheet effects as a propagation mechanism for macroeconomic shocks has been highlighted in many recent theoretical models, such as such as Bernanke et al. (1999).

To complement the macroeconomic approach to common currency areas, Swofford (2000) proposed microeconomic foundations for the existence of a common currency area and tested the Euro area for consistency. The basis for these microeconomic foundations is that for a common currency area to exist, the people included in the area must use the same assets as money. Fore-shadowing the current issues with the 'euro zone', Swofford (2000) found some evidence that the euro zone, as then constituted, did not meet the conditions for a common currency area. In which case, formation of a monetary union requires strict control of member country fiscal deficits and probably also fiscal transfers between member countries or states, as the 2010 euro zone crisis has illustrated. In results that are complementary to this paper, Swofford (2008) found an ad hoc group of East Asian countries meet these conditions.

The existence of a common currency area of the ASEAN countries and Taiwan is the focus of this paper. Due to size and location Taiwan appears a natural member of a grouping including ASEAN countries. Thus we examine a number of countries that have politically self-selected to join together in ASEAN, with the addition of Taiwan. This is novel, as this combination of Southeast Asian nations has not previously been studied vis-à-vis microeconomic foundations of a common currency area. We find the data to be consistent with the microeconomic criteria for these countries forming a common currency area. These microeconomic foundations are outlined next.

2. Microeconomics and revealed preference Testing of a common currency area

A common currency area can be defined as any geographic area in which the economic agents treat the same asset or group of assets as providing monetary services (Swofford, 2000). If the people of Taiwan use currency as money and the people of Thailand use currency and checkable deposits or some additional assets as money, then the two areas do not form a common currency area. However, if the

³ ASEAN, the Association of Southeast Asia Nation consists of 10 countries: Burma (Myanmar), Laos, Cambodia, Vietnam, Thailand, Malaysia, Indonesia, Brunei Darussalam, Singapore and the Philippines.

Table 1
Foreign Labor Ratio in Five East Asian Countries.

Country	Percentage of Foreign Workers/Labor Force (Year)	Source of Information	Main Source Countries
Brunei Darussalam	30% (2008)	ILO (2009)	Indonesia, Philippines, Thailand, Malaysia
Malaysia	19.48% (2008)	ILO (2009), Department of Statistics, Malaysia (2009)	Indonesia, Philippines
Singapore	30% (2008)	ILO (2009)	Indonesia, Philippines, Thailand, Malaysia
Taiwan	3.36% (2008)	Council of Labor Affairs Online Database (2009)	Indonesia, Philippines, Thailand, Malaysia, Vietnam
Thailand	6.68% (2008)	ILO (2009), National Statistical Office (2009)	Myanmar, Lao PDR, Cambodia

people in each of the two areas use only currency or both currency and checkable deposits as money, then the two countries potentially form a common currency area.⁴

The microeconomic conditions for a common currency area require that the common currency is an asset, or assets, in the optimizing function of economic agents. If this common money is held by consumers for the liquidity services it provides, then it can be modeled in the consumer's utility function as:

$$U = U(\mathbf{x}, \mathbf{m}) \quad (1)$$

where U is a well-behaved utility function, \mathbf{x} is a vector of non monetary goods and asset s and \mathbf{m} is a vector of assets that provide monetary services.⁵

If people hold more than one asset for monetary services, then a common currency area must have monetary aggregates consisting of the same monetary components.⁶ As Barnett (1980) showed, for an economic monetary aggregate to exist, the assets combined into the aggregate must be at least 'weakly separable' from all other variables in the objective function. In monetary economics, 'weak separability' means that a monetary aggregate can be formed that includes only those financial assets that are (at least) 'weakly separable' from all other goods in the agent's preference. Thus, if a common money of more than one asset is to exist, it must be composed of assets that are (at least) weakly separable from all other goods. This restricts $U(\cdot)$ to be (at least) weakly separable in the monetary assets:

$$U = U(\mathbf{x}, V(\mathbf{m})). \quad (2)$$

Thus the weak separability criteria for aggregation of monetary assets is a way to identify 'money' as whatever people in the hypothesized common currency area treat as money. $V(\mathbf{m})$ is expected to contain currency and any other 'monetary' assets the agents treat as money.⁷

Given the reality that more than one person will live in the common currency area, then (1) or (2) are restricted further by the conditions for aggregating over economic agents. The restrictions for aggregation over agents are more stringent than those for aggregation over goods. As Deaton and Muellbauer (1980) point out, aggregation over agents requires that the preferences of each agent be at least quasi-homothetic. Quasi-homothetic preferences imply that each agent's Engle curves are

⁴ Even if the people of some or all of the ASEAN countries and Taiwan use currency and checkable deposits as money and can form a common currency area, but the economic criteria of Mundell (1961) and McKinnon (1963) are not met, then the gains from forming a common currency area may not be large enough to offset the costs. Hence a political consensus to form a common currency area may not emerge.

⁵ Feenstra (1986) shows that the liquidity costs and the utility of money approaches to modeling money demand are functionally equivalent.

⁶ Barnett (1980) originated the concept of an economic monetary aggregate.

⁷ For the euro bloc, Binner et al. (2009), and for the UK, Patterson (1991) and Drake et al. (2003), found that money in these two areas includes monetary assets in addition to currency.

linear, but need not pass through the origin. Thus, quasi-homothetic representations of $U()$ and $V()$ are required for aggregation over agents. The quasi-homothetic restrictions are very stringent and they are commonly sidestepped by assuming a representative agent, in the sense that all agents behave in an identical manner.⁸

We use revealed preference tests to check for the existence of an ASEAN and Taiwanese common currency area. The revealed preference tests do not require the assumption of a particular functional form, and they can be used with limited data observations. However, revealed preference tests do not allow for random behavior. These nonparametric tests are discussed in greater detail in Varian (1982 and 1983).

Let $p^i = (p_1^i, p_k^i)$ be the i th observations for the prices of some k goods and assets and $x^i = (x_1^i, \dots, x_k^i)$ denotes the corresponding quantities of the k goods and assets. Varian (1982) developed the generalized axiom of revealed preference, henceforth GARP. GARP can be defined:

$$\text{If } x^i R x^j \text{ then } p^j x^i \leq p^i x^i \text{ for all } i, j = 1, \dots, n.$$

If the data satisfy GARP, then there exists a well-behaved utility function that fits the data.

Further if the data are partitioned into two sets of goods and associated prices (p^i, x^i) , (r^i, m^i) , $i = 1, \dots, n$, then a utility function is weakly separable if a subutility function $V(\mathbf{m})$ and a macro-utility function strictly increasing in V such that $U(\mathbf{x}, \mathbf{m}) = U(\mathbf{x}, V(\mathbf{m}))$ can be found.

A test of weak separability is that the entire data set and any hypothesized weakly separable subgroup must satisfy GARP. Consistency with GARP is a necessary condition for weak separability. The sufficient conditions checked for in this paper are that the data satisfy GARP when the subutility function is calculated using the Afriat inequalities, see Afriat (1967). This aggregate good based on the subutility function is then included in the hypothesized overall utility function which is tested for consistency with GARP. If the data set including the aggregate good for the subutility function is consistent with GARP, then the original data are consistent with a well-behaved utility function weakly separable in the assets in the hypothesized subutility function. Since they include an aggregate good constructed using the Afriat inequalities, we call this sufficient conditions the Afriat sufficient conditions. As Varian (1985) points out, if the Afriat sufficient condition checked for this paper does not obtain, some other sufficient condition might still obtain. Thus if only the Afriat sufficient condition is not met, we can not reject the hypothesized structure of preference or the proposed common currency area. The next section of the paper reviews the data used to implement this test.

3. Data sources and considerations

The data used for this paper are from the International Monetary Fund (2010) and the Aremos DataStream from the Taiwan Economic Data Center (2009). These data are annual observations for the period 1991 to 2009.⁹ From these sources annual data were gathered for Bruni, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Taiwan, Thailand and Vietnam. The series of data taken for these countries include population, gross domestic product (GDP), the consumer price index (P), money (M), quasi-money (Q), the deposit rate (r), the lending rate, (R), and the dollar exchange rate.

The money series consist of currency and demand deposits. The quasi-money series is made up of savings and time deposits. The consumer price index is used as the price of a unit of consumption in each country. To convert the consumption, money, and quasi-money series into real per capita terms the consumer price index and population series were used. To construct data series on areas broader than one country, the exchange rate is used to convert each series to United States dollars.

The appropriate price for each category of financial assets is its user cost (Barnett, 1980). The user cost is a discounted interest rate differential, $(R - r)/(1 + R)$. The differential is the opportunity cost of

⁸ The assumption of a representative agent is necessary unless consistent micro or panel data exist for each country or area in a hypothesized common currency area.

⁹ Unfortunately the data did not go back to 1991 for every country. We gathered the data back as far as it was available for each country.

holding a particular asset rather than the benchmark asset. Thus the user cost is the one period opportunity cost of the monetary services the individual gets from holding assets that yield less than the benchmark asset. Consequently, currency and non-interest bearing deposits receive the highest weights because they are highly liquid assets and (correspondingly) have high user costs (in terms of interest foregone). Interest bearing time deposits by contrast pay a relatively high rate of interest and are less liquid, and so attract a lower weight than might be expected from the size of such deposits alone. These weights thus reflect the differences in transactions services provided by various monetary assets, hence the resulting monetary index is closely related to the overall level of liquidity in the economy and therefore to total spending in the economy.

These data were converted into nine and up to ten-year annual time-series. These time-series were aggregated both quarterly and annually for each individual country as well as for the ASEAN/Taiwan combination. The individual country time-series range from seven years for Cambodia to ten years most other countries. The aggregate time-series is a seven year time-series as it is limited to the shortest time-series of any of the individual countries. The aggregates are a weighted average of the data for each country that comprises the respective area. The results from checking these data for consistency with the microeconomic criteria for the existence of a common currency area are presented in the following section.

4. Revealed preference results

The data described in Section 3 above were checked for consistency with the microeconomic criteria for the existence of common currency using Varian (1985) three-step revealed preference test for weak separability that was described in Section 2. Consistent with the modeling in Section 2 above, the specification checked was:

$$U = U(\text{GDP}, V(\mathbf{M}, \mathbf{Q})). \quad (3)$$

That is the data for a representative agent in the ASEAN countries, Taiwan, an aggregate of the data for ASEAN countries and an aggregate of the data for the ASEAN countries and Taiwan were checked for consistency with the microeconomic foundations of a common currency area.

As presented in Table 2, for annual data sets both the necessary and the Afriat sufficient conditions obtain for the individual countries, except for Myanmar and the Philippines for whom the Afriat sufficient condition did not obtain.¹⁰ Further, collectively the aggregate data for the ASEAN countries and the ASEAN countries and Taiwan meet the necessary and Afriat sufficient conditions.¹¹ This suggests that people in these ASEAN countries and Taiwan treat currency, demand deposits and quasi-money in a similar way in their preferences. Thus, these annual results are consistent with this new combination of countries forming a common currency area.

Thus, overall, the data indicate that ASEAN countries and the ASEAN countries and Taiwan might form a common currency area. These results are consistent with and can be viewed as supportive of those from Swofford (2008) for an ad hoc group of East Asian countries that in part overlap with the countries studied here. These results are particularly supportive of those countries like Singapore with the most observations that are in both studies.

That the data are consistent with a common currency area does not overcome various macroeconomic and political issues that might arise within the individual countries. For example, seigniorage and control of central banking institutions would need to be allocated between the members in such

¹⁰ We are reminded that this sufficient condition is not necessary and this preference structure can not be rule out. For some of the countries with a smaller number of observations, observations were available for the entire 1991 to 2009 sample, but breaks in the data and violations of GARP required the sample be truncated for the weak separability tests.

¹¹ For countries with 19 observations the sample runs from 1991 to 2009. For countries with 14 observations the sample runs from 1996 to 2009, for countries with 13 observations the sample runs from 1997 to 2009, for countries with 11 observations the sample runs from 1999 to 2009 and for countries and areas with 9 observations the sample runs from 2001 to 2009. For the aggregated areas tests, shortest sample among the countries was the limiting factor and thus each of them only had 9 observations.

Table 2

Revealed Preference Test Results for Annual Data on ASEAN countries and Taiwan.

Area	Utility Function GARP	Subutility Function		obs
		Necessary	Afriat Sufficient	
Brunei	Y	Y	Y	11
Cambodia	Y	Y	Y	9
Indonesia	Y	Y	Y	9
Laos	Y	Y	Y	9
Malaysia	Y	Y	Y	19
Myanmar	Y	Y	N	13
Philippines	Y	Y	N	19
Singapore	Y	Y	Y	19
Taiwan	Y	Y	Y	19
Thailand	Y	Y	Y	13
Vietnam	Y	Y	Y	14
ASEAN	Y	Y	Y	9
ASEAN and Taiwan	Y	Y	Y	9

Note: Y implies the condition is met and N means a condition is not met. The reader is reminded that the Afriat sufficient condition per [Varian \(1985\)](#) is not necessary and that other sufficient conditions might hold. The number of observations varies among countries and areas due to data limitations.

a common currency area.¹² Naturally by looking at data, we are looking at the past and past behavior may not necessarily hold for changing conditions in the future. The people in any area could decide to form a common currency area and adjust their future behavior accordingly or they could independently change how they treat the assets examined here.

5. Summary and conclusions

This research is highly topical at present given the 2010/2011 turmoil in the euro zone and very important for economics and policy because if the ASEAN countries and Taiwan were to form a common currency area, there would be transactions costs savings. Furthermore, such a common currency area also would end the different national currencies that might act as implicit barriers to trade among the member countries.

We provide the first evidence to reveal that annual data for the ASEAN member countries and Taiwan are consistent with the necessary and sufficient conditions for the microeconomic foundations of a common currency area. Further data for these ASEAN countries and Taiwan aggregated are consistent with the necessary conditions and sufficient conditions for a common currency area. These results can be taken as supportive of an ASEAN and Taiwan common currency area.

Although the necessary microeconomic conditions for a common ASEAN and Taiwan currency area hold, it is clear from the recent evidence on the financial crisis in the euro zone, for example the problems of Greece and Ireland in 2010/2011, that political co-ordination over fiscal policy is also required for a common currency area to succeed in practice as a monetary union whose common currency is credible in the international capital markets. We echo the conclusion of [Bhattacharya and Binner \(1998\)](#) that a convincing case for substantial economic benefits must be made to offset the loss of a policy tool before proceeding with a monetary union. Following [Kim and Lee \(2008\)](#) future research should examine in detail the political, social and cultural implications of such a union for the ASEAN countries and Taiwan.

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¹² Clearly seigniorage could be allocated by population in the countries, but such an agreement would need to be reached.

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