

Exchange Rates and Exchange Rate Policies in Vietnam Under French Rule, 1878-1945 *

Jean-Pascal Bassino **
and
Hironobu Nakagawa ***

Abstract

Although the French franc, a gold standard currency before 1914, and between 1929 and 1936, was the sole legal tender within the framework of the French colonial Empire, Vietnam was an exception. This country, along with the other territories which were part of French Indochina, had a separate national currency, the piastre, established in 1878, which was not pegged to the franc until 1930. The purpose of this paper is to investigate the rationale and effectiveness of exchange rate policies in Vietnam, considered as a representative case of a small open Asian economy in the context of pre-Bretton-Woods exchange rates instability in Asia. As a country deeply integrated in intra-Asian trade, but also receiving manufactured goods, loans and private investments from France and other European countries, Vietnam was concerned about the fluctuations of exchange rates both in the East and the West. Our study relies on the collection of a comprehensive set of nominal exchange rates of the piastre against the main Western and Asian currencies (yearly average series from 1878 to 1945, and monthly average between 1923 and 1940). Stylised facts on long run evolution suggest that the piastre exchange regime based on the silver standard was, surprisingly, an efficient arrangement before 1930. In addition, cointegration tests on bilateral exchange rates indicate that the franc-peg, introduced in 1930, was rather a disappointing policy.

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* Paper presented at the Asian Historical Statistics Project (AHSTAT-COE Project) conference "Quantitative Economic History of Vietnam," Tokyo, June 18-19, 1999. We thank Hitotsubashi University, Paul Valéry University, the French Embassy In Tokyo, and the Centre for National Scientific Research, Tokyo for supporting the conference. Intellectual and financial research support by the Asian Historical Statistics (AHSTAT) COE Project is gratefully acknowledged. The authors also thank other institutions who supported this research, respectively the Paul Valéry University Research Fund and the Japan Foundation for Jean-Pascal Bassino, and the Japan Society for the Promotion of Science (JSPS) for Hironobu Nakagawa.

** Paul Valéry University, Department of Economics, Law and Business, Campus Vauban, 30000 Nimes (France) and Centre for International Economics and Finance (CNRS), 13290 Aix-en-Provence (France). <bassino@bred.univ-montp3.fr>

*** Institute of Economic Research, Hitotsubashi University, Naka 2-1, Kunitachi, 186 Tokyo (Japan). <nakagawa@ier.hit-u.ac.jp>

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Introduction

Although the global context of exchange rate regimes before Bretton-Woods has been extensively studied, very limited attention has been dedicated to their implications for small open economies, such as Central European or Southeast Asian nations, and the policies implemented by these countries in response to global institutional changes. As a small open economy in the context of pre-Bretton-Woods exchange rates regimes, Vietnam can be considered as a representative country for investigating the implications for Asian countries of the successive changes in the rules of the global monetary game. The interest of a case study on Vietnam is threefold. First, this country was deeply involved in intra-Asian trade, but also received manufactured goods, loans and private investments from France and other European countries; its economy was therefore affected by the fluctuations of exchange rates both in the East and the West. Secondly, Vietnam was concerned about the shift to the gold standard of Asian countries, but adopted a laggard behaviour; among the last in East Asia, just before China, to officially abandon the silver standard and the last one to join the gold exchange standard in 1930. This provides an opportunity to reinvestigate the rationale of this regime, in the Asian context. Thirdly, adopting the gold exchange standard, in 1930, was the final stage of an evolution toward monetary autonomy; but, ironically, as a consequence of collapse of the international monetary system, it became equivalent to a franc-peg in a context of flexible rates.

The stylised facts and the main features of small open countries' exchange rate regimes, and the relationship with the global institutional changes or regional context have been described briefly in different studies, but no attempt has been made to evaluate the impact of their exchange rate policies¹ using econometrics. This is especially true for the spread of the gold exchange standard in Asia (excluding Japan) and the inter-war instability.

The purpose of this paper is to investigate the rationale of exchange rate policies in Vietnam, considered a representative small open economy. The next section offers a general discussion on exchange rate policies in the global context, and presents the data sources and the methodology. Part II. investigates the changing status of the piastre in the regional context, and its implications for exchange rate policy. Part III describes the long term and short term patterns of exchange rate of the piastre against Western and Asian currencies. Part IV provides an econometric analysis evaluating the impact of the 1930 shift using monthly data of nominal exchange rates of the piastre and Asian currencies.

I. Institutional context and methodology

Generally, research on exchange rate policies has tended to focus on the rationale of policy shifts by the main economic powers, which were the contemporary makers of the rule. The implicit assumption seems to be that all the countries around the world were playing the same game and that, therefore, in a given historical context, the same rules applied to all the players in a similar fashion. This approach neglects the fact that the political economy of international interdependence consists, at least, in a two stage world money game: the first stage is the game of agreeing to choose an international monetary regime; the second stage is the game of monetary interplay under given sets of rules (Hamada 1985).

¹ The study by Lazaretou (1996) on Greece is an exception. For a general presentation of the institutional framework and exchange rate policies in main economic powers, see Bayoumi, Eichengreen and Taylor (1996), Bordo and Schwarz (1984), Braga, Eichengreen, Reis (1996), Eichengreen (1992), McKinnon R.I. (1993); Adcroft and Oliver (1998) provide several indications on most smaller countries. See Eng (1997), for an account on Asia before 1913 (including series, or new estimates, of bilateral exchange rates for Southeast Asian currencies other than the piastre between 1880 and 1913), or Thiollier (1930) before 1930, and also, on exchange rate policies in particular countries, Chiang (1976) on Malaysia, Ingram (1971) on Thailand, Hanna (1902) on the Philippines, and Klein (1990) on Indonesia.

Exchange rate policies for Asian currencies in the global context

The international public goods introduced by the leading powers are endogenous for the system as the whole, or for the big players, but not the small open economies². They have to adapt to this exogenous constraint and are subject to political pressures, economic dependence³ and, more specifically, the consequence of instability on the part of the dominant powers (“hegemonic instability”). Not only was the hegemonic stability elusive under the classical gold standard or during the interwars (Eichengreen 1990), but the dominant powers were not necessarily benevolent (Snidel 1985). As a Stakelberg follower, the hegemony (or the club of producers of international public goods) could benefit from more gains than other players while the burden of cooperation fell on the less powerful players, not qualified for membership into the club⁴. This remark could apply to the relationship between the core countries, Western Europe and the US, and the periphery, Central Europe, Asia and Latin America, with the second group of countries making a more substantial contribution to implementation of international regimes than usually acknowledged (Eichengreen 1992).

In the context of the general move to the gold standard or gold exchange standard, between 1880 and 1930, it seems common sense to consider that a decision to maintain the silver standard was a second best exchange rate policy, only suitable for countries unable to join the gold exchange standard (Persia, Abyssinia, China). Vietnam provides an intriguing case of a deliberate choice to stay on the silver standard until 1930. It should be noted that the local administration had both the technical skill and, at least from the late 1890s, the financial resources required, as well as several rational motivations, for a shift to the gold standard, and was fully aware of the implications of its policy. In addition, Vietnam was an amazing exception within the framework of the French colonial Empire, where the French franc, a gold standard currency before 1914, and between 1929 and 1936, was the sole legal tender. Vietnam had its own currency, the piastre, established in 1878, which was not pegged to the franc until 1930. Vietnam was not technically speaking a political entity: the three Vietnamese regions, Cochinchina, Annam and Tonkin (respectively Southern, Central and Northern Vietnam), were parts of French Indochina along with Laos and Cambodia⁵. But the piastre was considered by the French administrators of the General Government as Vietnam’s national currency (Thiollier 1930)⁶. For Vietnam, the shift to the gold exchange standard implied a decision to adopt the franc-peg at a time of increasing uncertainty. In the Asian context, the silver standard was initially based on pure market mechanisms, in a sense even more strict than the classical gold standard. Considering the general theoretical consensus against fixed exchange rates, one may wonder why the monetary authorities in Vietnam had good reasons to abandon this flexible rate. Was it a consequence of a policy based on erroneous assumption in terms of optimal peg⁷ ?

² Let us assume here that institutions are endogenous as exposed by North 1990).

³ Klingberger (1981) introduced the debate on international public goods, exploitation and free rides in a context of economic dominance or hegemony. Argy (1990) presents a survey on the choice of exchange rate regime for a small open economy in the present context.

⁴ In that sense, even India and China could be considered as small open countries; on exchange rate policies in China or in India before 1945, see Remer (1980) and Tomlinson(1986).

⁵ In 1898, these territories were organized as French Indochina which was ruled from Hanoi by the General Government, an autonomous body under supervision of the Ministry of the Foreign Affairs (who was in charge of the administration of the four protectorates: Annam, Tonkin, Cambodia and Laos) and the Ministry of the Colonies (Cochinchina was a colony). Hanoi and Saigon were clearly the core of this political system, as indicated by the role of ethnic Vietnamese in this administration, including in higher ranks from the 1920s, and Laos and Cambodia a periphery, in a vision witnessing a strong legacy of the Empire of Annam.

⁶ A currency which was also used by two smaller nations of lesser importance, Laos and Cambodia, and other even smaller territories (New Caledonia, French Polynesia, French Territories of India, Chinese leased territory of Kwang Cheo Wan) in a sort of monetary union (and custom union in the case of French Indochina).

⁷ Friedman (1953); among recent accounts on mirage or unsustainability of fixed rates Obstfeld and Rogoff (1995), Eichengreen (1994). For a survey, see Taylor (1995), or more specifically of optimal peg Williamson (1985).

However, the abandonment of flexible rates for fixed rates may be interpreted in two alternative ways: either as a move from silver to gold standard, by way of the French franc, or as a franc-peg in a context of increasing exchange rate instability. A shift from one exchange regime to another is not necessarily a clear move. It may take the form of a gradual and complex process involving decisions which we may identify, at first glance, as erratic or contradictory. As observed by Eichengreen (1990),

*'Anyone who attempts to analyse the properties of alternative international monetary regimes is immediately confronted by the gap between the textbook models of international monetary systems and historical experience. Rather than being demarcated by distinct beginning and end points, the transition between regimes is often gradual. Rather than neatly encapsulating the features of a theoretical model of fixed or floating rates, actual international monetary systems often combine features of different models'*⁸.

In the case of Vietnam, and more broadly East Asian countries, the reason for this reluctance or gradual shift is that we actually had a three levels game, the two levels indicated by Hamada (1985) (definition of the rule, interplay under the set of global rules), but also a third level of regional game: it involved the answers to the changes of exchange rate policies by local players under global and regional constraints, especially a trade-off between the impact of a shift in exchange regime upon intra-Asian trade on the one hand, and the economic relations with the West, on the other hand.

Data set and Methodology

This study relies on the collection of a comprehensive set of nominal exchange rates time series of the piastre against the main Western and Asian currencies; yearly average series from 1880 to 1954, monthly average between 1923 and 1940. This set of data includes exchange rates against the main western currencies, namely the French franc, US dollar, and the pound sterling, and most Asian currencies, namely the Japanese yen Straits dollar, Siam tical (or baht after the shift to the gold-exchange standard), Dutch Indonesia guilder (rupiah after 1941), peso of the Philippines, Indian rupee (also used in Burma), Shanghai Haikwang tael (Chinese dollar after the monetary reform of 1933) and Yunnan dollar.

Exchange rates were collected in Vietnam by the 'Banque de l'Indochine' (BIC), a private institution which was granted a monopoly for acting as central bank, and which was the main institution for exchange operations in Saigon and Hanoi, for both private and public agents. The present Indocam (a French private bank) inherited the archives of the 'Banque de l'Indochine' (private archives), when Vietnam, Cambodia and Laos gradually gained full and effective independence. Access to BIC private reports is strictly restricted but part of the information collected by the Banque de l'Indochine was routinely transferred to the General Government and the Ministry of the Colonies, especially yearly averages and monthly averages on exchange rates. These series were published in Statistical Yearbooks (*Annuaire Statistique de l'Indochine 1913-1946*; *Annuaire Statistique du Vietnam 1949-1953*) or monthly official publications by the General Government of Indochina (*Bulletin Economique de l'Indochine*). For the period before 1913, we can find several yearly data of the exchange rate piastre-franc in Brenier (1913). These series were usually based on observation of the Saigon market, the main import-export harbour in former Indochina. The sole exception was the Yunnan dollar, the rate of which, against the piastre, was measured by the Yunnan Railways Company. Even if exchange rates were different in Hanoi and Saigon, we can assume that the exchange rate in Saigon is an acceptable proxy for Vietnam as a whole⁹.

⁸ Eichengreen (1990a), p. 15.

⁹ The piastre was also used in Cambodia and Laos but, as far as exchange rates are concerned, only Vietnam mattered really. Monetary circulation in Cambodia and Laos was not negligible but these territories were dependent on Vietnam for foreign trade and financial services.

Observation of monthly evolution of exchange rates on the Saigon market could eventually exhibit deviations in comparison with data on the Hong Kong, Singapore and Tokyo markets. It is assumed that the Saigon market rate is an acceptable indicator. The piastre was not among the main currencies in East Asia, but due to the volume of Indochina's trade with East Asia and its structural surplus, commercial papers in different currencies were actually traded in Saigon and technically speaking the staff of the Banque de l'Indochine were not less skilled than those working for the leading British banks in Hong Kong or Singapore. Geographically, Saigon was situated in the very centre of Southeast Asia, and also halfway between the two main East Asian financial markets, Hong Kong and Singapore. These territories were also among the main trading partners. Accordingly, we expect the Saigon series to be balanced accounts of the monetary fluctuations in East Asia.

In addition to these primary sources, we could rely, for evidence and debates on institutional evolution, on numerous articles in reviews, books or reports dealing with the piastre or monetary policy which were published by civil servants following each exchange rate crisis, especially when the French franc was concerned. Almost all these authors were arguing in favour of a particular policy. It is quite difficult to distinguish between biased arguments and conceptual or theoretical confusion. The factors that influenced economic conditions were badly understood, or even unknown to several members of the colonial administration. We can, however, assume that political bias was the main source of distortion in the official reports. One example is the deliberately wrong statement that the piastre was actually a silver coin of 5 gold francs value, and therefore a multiple of the French franc¹⁰.

This indicates how reluctant several French civil servants were to acknowledge the monetary autonomy of Vietnam (or Indochina), even during the early 1920s, when France was unable to reintroduce the gold-standard for the franc (abandoned de facto in 1914) while the piastre was following the price of silver metal on international markets. We can find the same kind of statement in the late 1920s with an interrogation on the status of the piastre: "Is Indochina's piastre a currency?"¹¹. On the other side, many civil officers in Indochina were well aware of the fact that, due to the magnitude and share of Indochina's foreign trade with China and Hong Kong, a silver currency was an asset and that the cost of depreciation of the piastre against the franc was balanced by this benefit.

These sources will be used for describing the stylised facts in bilateral exchange rate long-term patterns, and identifying the features in the debates among civil servant and business circles. In addition, the monthly data provide an opportunity to investigate the efficiency of the shift in exchange rate regime in 1930. The standard approach would be to examine the impact on output or foreign trade. However, it is not easy to identify the relationship between exchange rate and these aggregates. A change in real exchange rates should affect price competitiveness of the producers of tradable goods, assuming that they are not price makers on the world market. Unfortunately, the stylised facts do not support this approach. Between 1929 and 1933, we can observe a decrease in volume of Vietnam rice exports, by far the most important export item, in a context of appreciation of the local currency vis a vis Asian competitors (Siam and Burma) and the main importers (Hong Kong and China, Singapore). But Vietnam rice exports increased after 1934. Fine weather and good harvest, as well as other factors (cheapest inputs, productivity growth), could obviously compensate for a negative impact of exchange rate on the growth rate of output or export, especially in the case of a country at an early stage of industrialization.

Accordingly, we use an alternative approach focusing on the short-term volatility of bilateral nominal exchange rates of Asian currencies vs. Western currencies. We assume that an increase in volatility induces a perturbation for exporters in a context of high seasonality of exports, for rice and other raw materials, and eventually as a consequence for imports as well. The underlying hypothesis is that short-term stability of the parity could result from market mechanisms in the absence of any kind of formal cooperation. This implies, in the context of Southeast Asia, or more broadly of the group of countries

¹⁰ Adam (1922).

¹¹ Archimbault (1929).

involved in intra-Asian trade (including therefore Japan and India), that stability may be achieved regardless of the exchange rate regime of the regional partners, silver standard or gold exchange standard, if a minimal flexibility remains, which is no more the case with adopting a peg with a Western currency.

II. The rationale of exchange rate policies in Vietnam under French rule

While the French franc, a gold-standard currency before 1913, was the sole currency in other parts of the French Empire, a new currency, the French piastre, was created in 1878. During most of the period under investigation, 1878-1954, the French administration in Vietnam adopted a rather pragmatic approach to exchange rate policy, which appears quite exceptional by French colonial standards¹².

Exchange rate policy in Vietnam before 1914

At the end of the nineteenth century, Vietnam (along with Indochina's other territories) was part of the informal East Asian silver standard area. In 1878, 19 years after the occupation of Saigon by the French Navy, a monopoly was granted to the Banque de l'Indochine by decision of the Ministry of Finance, for issuing silver coins in Vietnam (up until this time, the Bank only had such right in respect of Cochinchina, surrendered as a colony in 1863 by a French-Vietnamese treaty). Initially, these piastre had a 27 g weight and with 90% of pure silver as an imitation of the US trade dollar. The piastre was intended as a substitute for all other currencies widely used in official and private transactions in Indochina, such as Mexican coins, but also US trade-dollar, Shanghai tael, and Japanese yen. But, as the silver-piastre was accepted as equivalent to other silver coins, of lower value, these new coins were quickly exported to China and Hong Kong. After 1889, the piastre became the equivalent of the Hong Kong dollar, 27 g with 90% of pure silver (equivalent to 24.3 g of fine silver).

The Asian context constitutes the rationale for a national currency in Vietnam. Under French rule, this country therefore had an independent exchange rate policy the determinants of which were the interests of a various set of mostly resident agents, French companies with activities in Vietnam, ethnic Chinese or Vietnamese business people, and the local public finance¹³. The Chinese trading networks controlling most of Vietnam's trade with East Asia were essential for the economic development of the colony, not only as traders but also as investors and managers in finance, agriculture, transportation and manufacturing. Due to the reliance on these Chinese networks, both inside and outside Vietnam, silver currency was clearly an asset, even from the viewpoint of the French colonial administration.

On the other hand, a true case for the introduction of the French franc as the sole legal tender clearly existed. Although both the French franc and the piastre were used for local transactions in Indochina, the French franc was the most important currency for public contracts (bonds issued on the Paris stock market for public investment in Indochina and their repayment by the colonial administration, payment to local firms for public works for the General Government, wages of French civil servants, etc.) or international trade, even if several figures were published in piastre. The colonial administration used to display amounts in local currency while calculating in French franc, especially in the case of public finance.

The shift towards gold standard (actually gold exchange standard) which occurred at the end of the 1890s, in Indonesia, Japan, India, and thereafter, during the 1900s, in the Philippines, Thailand, and the Straits Settlements, induced a dilemma for the colonial authorities in Indochina. The two most important export markets, Hong Kong and China, were still on the silver standard, but France and most Southeast Asian countries or territories were on the gold exchange standard. A commission for the monetary reform in Indochina was established in 1902, and three sessions were held in 1902, 1907 and 1914. The appreciation of the silver metal, and accordingly silver standard currencies during WWI affected the price

¹² This may have been explained by the aim to emulate the Dutch experience in Indonesia: heavy investment and long term commitment inducing finally huge revenues for Dutch private companies and the public finance of the Netherlands.

¹³ This was an essential aspect of what could be called a national economic policy under a colonial framework.

competitiveness of Vietnam's exportation but the impact was reduced by the demand for raw materials and the inflation in Europe during the war.

The consequences of WWI: depreciation of the franc or appreciation of the piastre ?

After WWI, the depreciation of the franc made it unacceptable for the French administration to renounce to the role of the national currency in colonial territories. The piastre exchange rate regime came under discussion. The actors of the local game were the Bank of Indochina, the General Government, and private business circles. For the BIC, exchange operations between piastre and franc represented a significant source of income that would disappear in the case of implementation of a franc-peg policy. The most important issue was not the exchange rate regime itself but the possibility of maintaining its monopoly as a private institution acting as central bank, a much more important source of income¹⁴.

Although it could be assumed, therefore, that the colonial administration favoured a franc-peg for the piastre, high rank administrators, including the General Governor himself, interestingly, were the most influential opponents to the franc-peg during the early 1920s. Other local civil servants favoured the franc-peg, giving priority to the short-term objectives of the French government (increase of foreign currency reserves of the proposed franc-bloc, thanks to Indochina's overall foreign trade surplus) whatever the implications for Indochina's or Vietnam's future economic development and therefore future investment opportunities for French companies. Business organizations argued for or against the franc-peg on a ground of ideology or self-interest: prospects of increasing exports into France in the case of a franc-peg, fear of decline in price competitiveness for the opponents¹⁵.

After WWI, the general decline of the French franc was the unavoidable consequence of the abandoning of the gold standard. However, the appreciation of the piastre against the franc was strangely considered by the colonial establishment and the French Government as a crisis of the piastre. Therefore, a new commission was established in 1919 in order to explore the conditions for a monetary reform in Indochina inducing exchange rate stabilization against the franc. The depreciation of the franc had tremendous implications for several French firms, especially those engaged in mining in Indochina and exporting of raw materials to France.

In 1920, a report to the Minister of Colonies by the Indochina Committee, which represented various business organisations involved in trade or investment in Indochina, expressed the view that it was no longer acceptable to have in French Indochina a "Chinese monetary system". The Committee argued that the government had to decide whether Indochina should be a Chinese colony or a French one. Accordingly a proposal was presented for the introduction of the French franc in Indochina, under the name of piastre in order to avoid a loss of confidence in the currency by Indochinese which could eventually lead to social unrest¹⁶.

A strong argument in favour of this proposal was the shortage of silver coins, brought about by the control of minting and the fact that during WWI, the Banque de l'Indochine was not granted the authorisation for producing new silver coins which would have implied import of silver metal from the US or other countries. As a consequence of the war and massive importing of raw materials and equipment, France experienced a new situation of shortage of foreign currencies. In order to compensate for this shortage of coins, the Banque de l'Indochine was allowed to reduce the legal reserve of silver coins to the amount of notes, from one to three to one to five in 1916, eight in 1918 and twelve in 1920. But these measures did not reduce the appreciation of the piastre against the franc.

¹⁴ Meuleau (1990) and Gonjo (1994) deal with the Banque de l'Indochine and exchange rate policy. They focus on the viewpoint of conflict of interests between the Banque de l'Indochine and Indochina General Government (or more broadly the colonial administration, including therefore the Ministry of the Colonies, and the Ministry of Foreign Affairs officially in charge of the protectorates). But actually, the Banque de l'Indochine adopted a cautious and pragmatic approach in the debate on exchange rate policy.

¹⁵ Giacometti (1997) shows how exchange rate policy was a consequence of negotiations between different sets of public and private agents in a non co-operative game.

¹⁶ Quoted in Giacometti (1997).

The real issue was in fact Indochina's international trade surplus. With French international trade running a huge deficit, the government was desperately looking for any kind of measure that would immediately improve the balance of payments of the franc-zone (France and colonies) and open the way to the reintroduction of the gold-standard, as soon as possible. In addition, without a franc-peg, Indochina's trade surplus was seen as a source for further depreciation of the franc against the US dollar and the sterling. In fact, Indochina had the choice of importing either gold or silver, contributing to the appreciation of the sterling, still on the gold standard, or the US dollar, since America was the main world producer of silver metal.

While part of the colonial establishment was actively preparing the shift to the franc-peg, the new General Governor Long decided, in March 1920, to introduce a forced rate for the notes. Accordingly the Banque de l'Indochine was allowed, temporarily, not to change notes for silver coins. But at the same time, he decided to rely on the value of the silver coin on the New York market for piastre-franc quotation. This official rate was therefore based on the assumption that even under forced circulation, Indochina's piastre was fluctuating around the value of metal on the world main silver market. Thus, the answer of Indochina's General Government to political pressure in France favouring the franc-peg was to confirm the silver standard with the most unquestionable reference regarding the price of silver; as a consequence, the forced rate was actually an inconvertibility of notes, which had exactly the same value as coins and remained perfectly accepted by private and public agents with almost no premium for the coins.

This policy reflected the strong autonomy of political authorities in Indochina. We can also assume that the General Governor and the Ministry of the Colonies agreed on a trade-off between short term and long term efficiency. The General Governor and the major part of the local administration favoured long-term economic development of Indochina, which was expected to have a positive impact for France. This policy was well accepted by private agents in Indochina and therefore extremely successful; in fact, it increased the autonomy of the piastre against the franc.

Adopting gold exchange standard or franc-peg ?

A new Commission for Monetary Reform, composed of civil servants and representatives of the Chambers of Commerce of Saigon and Hanoi, was established in 1920 by General Governor Long¹⁷. For the first time, there was a strong participation of seven Indochinese, five Vietnamese and two Cambodian, all of them appointed as top rank civil officers, representatives of the local administrations. The five Vietnamese members constituted a sub-commission presenting a separate report. They insisted on the need to preserve Indochinese interests and especially to avoid a sudden depreciation of the silver piastre, which constituted the most important part of Vietnamese household savings. While emphasising the past role of silver standard for economic development, they proposed to join the gold standard.

An overwhelming majority of the commission adopted a proposal to keep the current piastre coins rather than accepting the creation of a new piastre with only half the value in silver, 12 g instead of 24 g. Finally, the commission debated on the rate to be adopted for the gold standard. The civil servants proposed 4 gold francs (1913), while the representatives of business associations argued for a lower rate, 3.5 gold francs, in order to promote rice and other natural product exports. Given Indochina's trade surplus, the administration's viewpoint was that the main risk lay in the possible effect of increasing the price of imported goods, as a consequence of a devaluation, and thus an effect on domestic inflation, decline in native households' purchasing power and public finance deficit. In addition, in a context of steady economic growth, as was the case during most of the 1920s, inflation would have induced pressures on wages, therefore hampering export sector competitiveness. Following these considerations, the 4 gold franc rate was finally proposed.

General Governor Long's administration also engaged in a policy of increasing the share of the US dollar in currency reserves. A special account of the General Government at the Banque de l'Indochine was used to buy US dollars or short term bonds in the same currency on the New York market. The new 16 for 1

¹⁷ Quoted in Giacometti (1997).

official gold-silver rate implemented by the US administration, in 1919, was immediately followed by a decision of the General Government to adopt the same rate for the payment of Cochinchina's rice exports (wholesale prices of rice among East Asian Chinese networks were denominated in gold, including in Hong Kong and China). This measure favoured importation of gold rather than silver as a compensation for Indochina's structural trade surplus. It seems very tempting to link this policy to the remarkable economic prosperity of the colony during the 1920s.

Implications of the peg

The decision to adopt the French franc as a nominal peg for the piastre, in 1930, was also de facto a shift to the gold standard France had just officially adopted. Due to the huge amount of hard currency reserve, adoption of the gold standard by Indochina could actually have been possible long before that date, probably as early as 1920. This indicates a reluctance on the part of the French government to recognise that the currency of a French colony, the piastre, was stronger than the franc. It is considered that the peg had an extremely adverse influence for the Vietnamese economy in the early 1930s. The French franc remained a gold standard currency until 1936 while Japan, UK and later the US abandoned it and favoured a depreciation of their currencies. This context strongly affected the commercial relations with China and Southeast Asian countries. The competitiveness of Vietnam's products declined steadily against Asian competitors and the local exporters tended to focus on the French market under bilateral protective agreements.

After 1936, the depreciation of the French franc and its implications for the piastre under the franc-peg favoured a stabilisation of exchange rates with Asian currencies and especially the Japanese yen. It should be noted that convergence occurred around 1938, and thus before the outbreak of War in Southeast Asia and the outcome of the Second World War in Europe. Under Japanese indirect rule (1940-1944), the piastre was part of the yen-zone, meaning it was actually pegged to the yen about at a par value (1.03). However, the acceleration of inflation in 1942 and the 1943-1945 hyper inflation make it almost meaningless to investigate nominal change during WWII. But since a large part of the monetary circulation was in silver coins, the piastre remained a very attractive currency in a context of hyper inflation.

The situation was even more complex during the summer of 1945, due to the issuing of new 500 piastre military notes (gunpyo) by Japanese authorities in Hanoi and the subsequent refusal by the Banque de l'Indochine in Saigon to accept these notes in September. The officers of the Chinese occupation army in Hanoi being the main final owners of these notes, the Banque de l'Indochine was finally ordered by a Conference of allied powers (US, China, UK and France) to change these notes at the request of the Chinese military authorities. Vietnam regained formal independence in 1945 but the piastre remained franc-pegged as the common currency of Vietnam, Cambodia and Laos. The silver piastre was still subject to a black market exchange by the Viet Minh administration, French civil officers and soldiers leaving Vietnam, Chinese merchants and other wealthy private agents.

III. Long and short run patterns of bilateral nominal exchange rates of the piastre

The stylised facts long run evolution in the bilateral exchange rate of the piastre against Asian and Western currencies, before and after 1930, are examined in the first two subsections. The third subsection describes the most salient features in terms of short run volatility.

Bilateral exchange rate pattern before 1930

Considering 1929 as a benchmark year for exchange rate indices, we can compare long term patterns of the Indochinese piastre against Western and Asian currencies before and after the franc-peg (Figures 1, 2 and 3). Figure 1 confirms that the so-called 1920 crisis of the piastre was nothing other than an ideological construction by the French colonial establishment. A significant appreciation of the piastre occurred during WWI, but there was a dramatic decline of the French franc while the variation was relatively moderate and short lived against the sterling or the US dollar, or more interestingly the 1913 gold franc. In 1921, the rate was very close to the 1913 level for these two currencies and for the gold-franc. This

movement was mainly explained by the increase in silver price during WWI which also strongly affected the Chinese economy, and the stabilisation of the gold-silver rate during the 1920s.

Throughout the 1920s, the piastre-US dollar and piastre-sterling rates remained at stable levels, while the piastre-franc rate was extremely irregular. The piastre-franc rate and the price of 24.3 g of silver in franc were almost identical, a logical consequence of the silver standard, but with a deviation indicating a premium for the piastre rather than the metal. All these features indicate that the piastre was a healthier currency than the franc and that stability, from an international rather than French viewpoint, was achieved under an archaic silver standard which was actually the equivalent of a dollar-exchange standard.

We observe the same pattern with the different Asian currencies, for those on gold exchange standard (Singapore, Indonesia, Burma (India), Philippines). It was obviously the consequence of the piastre-US dollar or piastre-sterling rate. We observe a strong appreciation during WWI and a stabilisation close to the 1913 level around 1921. Regarding the exchange rate with the silver standard currencies, Hong Kong dollar and Shanghai tael, the stability was only slightly influenced by the shortage of silver coins in Indochina during the war; recurrent deviation persisted thereafter but of limited amplitude. The magnitude of the fluctuation in the case of the piastre-yen and piastre-peso exchange rates, during the 1920s, was mainly related to internal factors in these countries. Therefore, during the 1920s, Indochina's competitiveness was not affected by the exchange rates either with East Asian competitors, especially rice producing Thailand and Burma, or with clients, such as Singapore, Hong Kong and China.

Bilateral exchange rate patterns after 1930

With the introduction of the franc-peg, in 1930, it was expected that the piastre would benefit from a stabilisation of the exchange rate with the currency of the main capital goods supplier and, at the same time, would retain the advantage of the de facto gold-exchange standard adopted for the piastre, like most other Asian countries, since France was again on the gold-standard. In addition, the late 1920s was characterised by a stability of gold and silver prices, thus inducing a convergence process which also included China and Hong Kong.

	A	B	C	D	E	F	G
1		Taux officiel de	Taux de vente de	Valeur de la piastre	prix de 24,3 g d'argent fin à Londres		
2							
3	1890	4,16				1890	
4	1891	4,03				1891	
5	1892	3,63				1892	
6	1893	3,32				1893	
7	1894	2,86				1894	
8	1895	2,71				1895	
9	1896	2,74				1896	
10	1897	2,52				1897	
11	1898	2,43				1898	
12	1899	2,52				1899	
13	1900	2,57				1900	
14	1901	2,51				1901	
15	1902	2,21				1902	

Figure 1. Exchange rate index of the Indochinese piastre against Western currencies (100 in 1929)

	A	B	C	D	E
1		Taux officiel de	Taux de vente de	Valeur de la piastre	prix de 24 gr 3 d
2					
3	1890	4,16			
4	1891	4,03			
5	1892	3,63			
6	1893	3,32			
7	1894	2,86			
8	1895	2,71			
9	1896	2,74			
10	1897	2,52			
11	1898	2,43			
12	1899	2,52			
13	1900	2,57			

Figure 2. Exchange rate index of the Indochinese piastre against Northeast Asian currencies (100 in 1929)

However, the timing could not have been worse. The French colonial authorities were well aware of the financial crisis in the United States but they assumed that France was not concerned; actually, the French economy was relatively unaffected until the mid-1930s and France was able to maintain the gold standard until 1936 at a reasonable cost. As in the case of Britain, the colonial Empire provided an acceptable substitute for world trade under a system of franc block, franc-peg in Indochina and franc monetary system in all other colonies.

The situation was completely different for Indochina. Between 1930 and 1936, the piastre appreciated strongly against the currencies of all Indochina's trading partners in Asia, with the exception of Indonesia. Capital and consumer goods imported from France were increasingly expensive compared with imported goods from the US or Japan. And rice exports to China, Hong Kong and Singapore were not competitive following depreciation of the Thai and Burmese currencies. As a consequence of the franc-peg, Indochinese producers had no other choice but to renounce East Asian markets, and to accept dependence on protected access to the relatively unattractive French market.

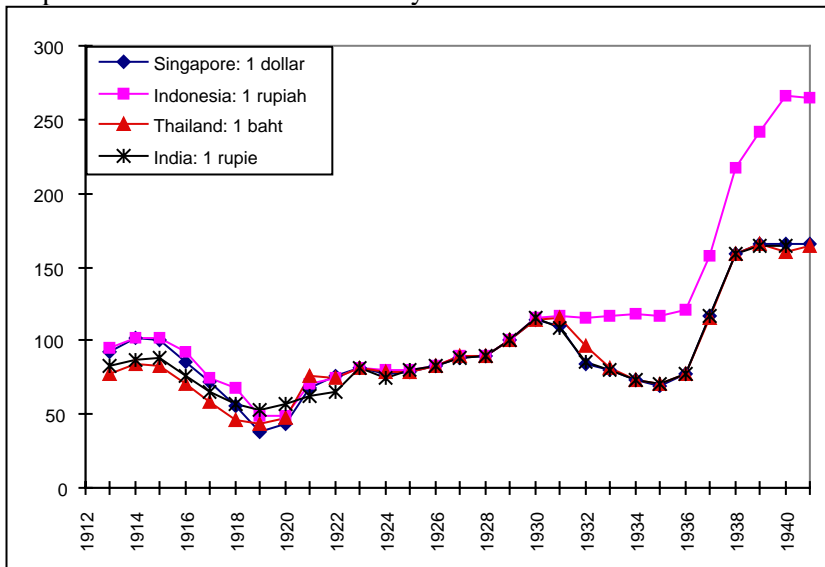


Figure 3. Exchange rates index of the Indochinese piastre against Southeast Asian currencies (100 in 1929)

In 1936, France abandoned the gold standard allowing the piastre to follow the depreciation of the franc. Although still under franc-peg, the piastre exchange rates against the Hong Kong dollar, the yen, the baht and the Indian rupee converged towards their 1929 levels. But the franc-peg exchange rate policy had reoriented Indochina's foreign trade towards France at the expense of trade with the traditional Asian partners and the only obstacle to this new trend was the outbreak of WWII.

Short term exchange rate patterns

We now explore exchange rate patterns from a short-term viewpoint, during two periods: between 1923 and 1930, under silver standard, and from 1930 to 1940, under franc-peg. We could expect that long term stability of the exchange rate would be associated with lower volatility. The main question concerns the influence of the franc-peg on short-term relationships with Asian currencies, in comparison with the situation prevailing under silver standard. The objective is therefore to investigate the efficiency of exchange rate regimes. Short term volatility was an important issue for Vietnam's economy under French rule given the seasonal fluctuations of rice exports to Hong Kong and Singapore, or other raw materials such as pepper, tea and coffee, or several cottage industry products and to some extent mining products.

In this study, volatility is measured as the standard deviation of exchange rate returns (defined as the first differential of logarithms). Tables 1, 2 and 3 present the volatility of the piastre between 1923 and 1940. The findings are as follows:

- Under silver standard, during the 1920s, exchange rate volatility of the piastre was much higher against the French franc than against Asian currencies, either silver standard currencies such as the Hong Kong dollar or the Shanghai tael, or other gold exchange standard currencies. The only exception was the Yunnan dollar but it was only a local and not fully convertible currency. In addition, volatility was actually moderate against the sterling and the US dollar which were the major reference currencies for international trade outside Asia, and part of intra-Asian trade.

- The shift towards the franc-peg coincides with an increase of volatility except obviously with the franc. But since exchange rate volatility of the piastre against the franc was declining steadily during the late 1920s, the gain induced by the peg was almost negligible. Volatility was low also, before 1936, with gold standard currencies, Dutch guilder, pegged Indonesian rupiah and the US dollar. In fact, for this last currency, this is true only until 1932 when the gold standard was abandoned for the US dollar, and after that date the volatility reached exceptionally high levels. Against the sterling we observe the same pattern in 1931 for similar reasons.

- Volatility increased significantly during the 1930s with all Asian currencies (except the Yunnan dollar again) and stayed well above 1920s levels. This was especially important in the relationship with the Shanghai tael and Hong Kong dollar, the currencies of the main trading partners in Asia. In the relationship with Asian currencies, we have actually two phases of high volatility during the 1930s: the first one between 1930 and 1932 as a consequence of the isolation of the piastre in the context of renunciation to gold standard in Asia; the second one around 1936-1937 when France abandoned the gold standard. It was only in 1939-1940 that the volatility decreased, mainly as a result of strict control of capital flows and foreign trade associated with co-ordination of exchange rate policies between France and Britain at the outbreak of WWII.

We can therefore conclude that, from the viewpoint of short-term relationships with Asian and Western currencies, the franc-peg induced a tremendous cost with very limited benefit.

IV. Econometric assessment of the impact of the 1930 franc-peg policy

This section presents an econometric analysis of nominal exchange rates during the inter-war period January 1923 - December 1940. (Figure 4 plots these exchange rates quoted in the 1913 gold franc.) Across periods demarcated by the 1930 franc-peg policy, we explore the interrelationship between the

piastre and the rest of the Asian currencies. This, we hope, will help us evaluate the effects of exchange rate policies in Vietnam under French rule. During the 1930s, while more than a few currencies were devalued, the piastre in fact stayed on the gold standard until 1937 when France let its currency float. Losing common movement with other currencies, the piastre's franc-peg policy could have adversely affected the intra-Asia trade and investment situation for Vietnam. Our purpose here is to provide a way to uncover this phenomenon. Specifically, by the use of unit root tests and cointegration technique, we intend to detect a long-run relationship between the piastre and other currencies, and how the link, should there be one, was affected by the policy shift in 1930.

Examination of nonstationary time series

Before getting down to unit root and cointegration tests, we should briefly review nonstationary time series econometrics.

Time series data need to be dealt with in accordance with their characteristics. More specifically, in studying trended series such as nominal exchange rate data, the analysis should consider the trend-stationary components (including a nonstochastic, deterministic trend) as well as stochastic nonstationary trend aspects of exchange rate series. Any shocks to a stationary time series are temporary and effects of the shocks will dissipate over time. A stationary series revert themselves to their mean and fluctuation around the mean has a constant amplitude. In a nonstationary process, on the other hand, the shocks will have permanent consequences and have an infinite variance over time. Random walk process is a representative of nonstationary processes. In fact, many macroeconomic data are nonstationary series; that is, they contain a unit root. One of the important implications of unit roots in data is that standard significance tests would be invalid in regressions involving such data. It leads to the 'spurious regression' even when the (nonstationary) variables are actually unrelated. Alternatively, on the other hand, if a linear combination of a set of nonstationary series is stationary (i.e., a linear combination of variables of the same order of integration can form a time series with a lower order), the variables are said to be cointegrated. Intuitively speaking, each of the series may wander around randomly, but would not drift apart indefinitely. This indicates a long-run relationship that exists between these cointegrated variables.

As widely documented, nominal exchange rates are found to contain a unit root. Accordingly, applying cointegration technique to exchange rate data would be an appropriate approach to detecting a long-run relationship among currencies.

Unit root tests on Asian exchange rates in the inter-war era

Before conducting cointegration tests to detect a long-run relationship among the currencies of our interest, we need first to conduct unit root tests on each variable to determine whether it is stationary or nonstationary. (That is, to check whether it is a process characterized by a deterministic trend, by a stochastic trend, or by both.) In carrying out the unit root tests, we consider a univariate autoregression for each series:

$$\Delta s_t = \mu + (\rho - 1)s_{t-1} + \sum_{i=1}^k \gamma_i \Delta s_{t-i} + e_t,$$

where s is the log of the exchange rate at time t . The regression above may also include a time trend as a way of capturing deterministic trends. To test for the existence of unit roots, we apply augmented Dickey-Fuller (ADF) test. The ADF tests for the null hypothesis that $\rho=1$. Lagged values of Δs_{t-i} will be added so as to remove serial correlation in the residuals. The resulting t-ratio of the estimates of the coefficient on s_{t-1} is the augmented ADF statistics.

In general, studies on nominal exchange rates report that exchange rate time series data are nonstationary. Here we examine whether nonstationary property also holds for Vietnamese piastre exchange rates and

other Asian currencies in the inter-war period, when foreign exchange markets as well as trading practices are quite different from today's.

The results of the ADF tests for nonstationarity are reported in Tables 4, 5 and 6. Tests are conducted on exchange rate series of the piastre, Hong Kong dollar, Shanghai tael, Yunnan dollar, Straits dollar, Peso of the Philippines, Siam baht, Indonesian rupiah, Indian rupee and Japanese yen, everything quoted in gold French franc-1913. From Table 4 we find evidence of nonstationarity in the series for the piastre¹⁸, Hong Kong dollar, Shanghai tael, Yunnan dollar¹⁹. This is the case regardless of whether we include a time trend or not. Similar observation applies to the Straits dollar, Peso of the Philippines, Siam baht, Indonesian rupiah and Indian rupee, and Japanese yen. However, the results indicate otherwise if we take account of the possibility of an endogenous time break in the series²⁰, due to the shift from the period of limited variations in exchange rate within the gold points to the period of rampant currency devaluation. In this sense, caution is required in interpreting these results based on the data for the entire inter-war sample. That is because unit root tests conducted on the entire sample blend time series data from different exchange-rate regimes: the mid 1920s can be characterized as freely floating exchange-rate period, manifested by very few cases of exchange-market intervention by monetary authorities; the late 1920s is regarded as the gold-exchange standard era; and the 1930s is thought of as the managed floating period.

Next, we proceed with the unit root tests using the data for the periods before and after the franc-peg introduction in 1930. (Until 1929, the Vietnamese monetary system was based on silver currency and the piastre exchange rate had been floating.) Both of the sub periods are of our interest because such demarcation can offer information that helps us analyse the consequences of the move toward the French franc-peg policy. For example we would like to examine if the piastre and other currencies, especially silver currencies in China, shared common movement before 1930. If so, did the piastre maintain such association with other currencies even during the franc-peg era? Or was the piastre left out of the linkage as the country pegged its currency to the French franc?

Table 5 reports results from unit root tests using the pre-1930 sample. As can be seen, both the augmented Dickey-Fuller (ADF) test and Perron's structural break-adjusted test for unit roots suggest that the piastre, Hong Kong dollar, Shanghai tael, Yunnan dollar, and Japanese yen series can be considered nonstationary before 1930. The null of nonstationarity is rejected for the Philippines Peso, which firmly maintained gold parity during the inter-war era except for the period between May 1933 and September 1936. As for the Straits dollar, Siam baht, rupiah, and rupee, results of Perron's test indicate the presence of structural breaks in these series.

Table 6 represents the results of unit root tests applied to the sample period January 1930 to December 1940. Once the franc-peg policy was enacted in 1930, the piastre obviously became stable against the French franc and gold French franc-1913. A more interesting observation is that the piastre appears to display stationarity even after the French franc dropped from the gold standard in 1936. On the other hand, the Hong Kong dollar²¹, Shanghai tael, and Yunnan dollar exchange rates series continued to be nonstationary. For the rest of the currencies, the Perron's test results imply the possibility of structural break.

Given the above results from the unit root tests, we would conclude that - possibly with the exception of the peso of the Philippines before 1930 and the piastre after 1930 - each of the exchange rates more or less

¹⁸ Caution is required in interpretation as the piastre was pegged to the French franc during the period January 1930 – September 1936.

¹⁹ Yunnan Dollar underwent abrupt change in its value in January, 1928. Because such phenomenon can be regarded as a structural break in the data, careful interpretation is necessary.

²⁰ Perron's test of unit root with endogenous time break detects an indication that the null has been rejected as a result of a structural break. See Perron(1997).

²¹ When a time trend is included, the Hong Kong dollar shows a sign of nonstationarity.

seems to contain a single unit root; that is, they share a common stochastic trend. Accordingly, we can legitimately conduct cointegration tests on these exchange rates in the next section to see if we can detect a long-run relationship among systems of combinations of these Asian currencies.

Cointegration among Asian currencies in the inter-war era

If a system (set) of exchange rates is found to be cointegrated, they are linked together through a long-run relationship that prevents them from going far apart. In cointegration tests involving three or more variables, we apply the maximum likelihood method suggested by Johansen (1988, 1991) and Johansen and Juselius (1990). It is based on a vector error-correction model of the form:

$$\Delta X_t = \mu + \Pi X_{t-k} + \sum_{i=1}^{k-1} \Gamma_i \Delta X_{t-i} + e_t$$

where X_t is a $(m \times 1)$ vector of exchange rates. The parameter matrix Π contains information as to whether there is a long-run relationship among variables. The rank of Π equals the number of cointegration vectors. If the rank of the matrix Π is zero, the system reduces to a standard vector autoregression model, implying no long-run relationship among variables. If Π has a full rank, then all the variables are stationary. Cointegration is implied when the rank of Π is intermediate. That is, if $0 < \text{rank}(\Pi) = r < m$, there exists r cointegrating vectors which make the linear combination of X_t stationary. To test the rank of Π , Johansen and Juselius make use of maximum eigenvalue and trace statistics.

There are a number of studies that have taken this approach in examining exchange rates. However, previous studies²² that examined cointegration among currencies dealt with either currencies of major developed countries or Asian currencies using recent data that cover only about the last two decades or so. In our case, cointegration technique is employed to consider a long-run relationship that may have existed during the inter-war years among Asian currencies including the piastre in Vietnam. In order to assess the effects of the franc-pegged piastre policy after 1930, we divide the period into two sub periods of January 1923 - December 1929 and January 1930 - December 1940. The former coincides with the time when Vietnam was still on the silver standard and the latter is designed to match the time that the shift to franc-peg policy took place.

In applying cointegration tests over the period January 1923 - December 1929, we primarily examine the following three systems²³ of exchange rates: (1) the piastre and Chinese silver currencies - the Hong Kong dollar and Shanghai tael; (2) the piastre, Hong Kong dollar, Shanghai tael, and Japanese yen, all of which are shown to be nonstationary by both of the unit root tests adopted in the previous section; and (3) the currencies included in 2) plus those that appear to be nonstationary by the ADF test. (That is the piastre, Hong Kong dollar, Shanghai tael, Japanese yen, Straits dollar, Siam baht, Indian rupee, and Indonesian rupiah.)

As in Table 7, the cointegration tests yield mixed results for system (1) but posit evidence of cointegration for systems (2) and (3). Although the piastre as well as Chinese silver currencies of Hong Kong, and Shanghai are all silver currency, we could not reject the null of no cointegration. Most likely, what is common to these series are a deterministic trend, rather than a stochastic trend. Estimates of the coefficient on the drift term (constant term) in equation (1) confirm this: coefficients are -0.0002, -0.0002, and -0.0003 for the piastre, Hong Kong dollar, and Shanghai tael, respectively. It is probably this effect

²² A partial list includes, MacDonald and Taylor (1989), Baillie and Bollerslev (1989, 1994), and Diebold, Gardeazabal, and Yilmaz (1994), Aggarawal and Mougoue (1996), and Tse and Ng (1997).

²³ Due to a possible structural break in the Yunnan dollar exchange rate series around 1928, the cointegration results for the period 1923-1929 reported here do not include the currency. The qualitative results, however, would be similar even with the inclusion of the currency in a system. As for the Philippines peso, it was left out of the systems since its series for the period 1923-1929 appears to be stationary according to the unit root tests.

that we see on Chart 4 as a general downward trend. Lack of cointegration of the piastre and these Chinese currencies may be stemming from the fact that international flows of silver were in fact banned at that time, making shocks to the Vietnamese economy to be country specific.

Interestingly, however, when the Japanese yen is included in the system for the cointegration test, the λ -max statistic indicates the rejection of the null of no cointegration at the 10% level (Table 3). This evidence leads us to infer that prior to the introduction of franc-peg piastre in 1930, there had been a long-run linkage among the piastre, Hong Kong dollar, Shanghai tael, and Japanese yen exchange rates. In addition, when we consider all currencies that may contain a single unit root - i.e., system (3) - they are found to be cointegrated²⁴.

From all of these results, we would conclude that the piastre held a long-run association with other Asian currencies before it was pegged to the French franc in 1930.

Next we move on to the examination of the piastre's relationship with the rest of the currencies during the franc-peg era. From 1930, being pegged to the French franc, which was on the gold standard until 1936, the piastre was not able to keep up with the (deterministic) time trend in other exchange rates. As widely known, more than a few currencies underwent a series of devaluations in the 1930s. The piastre became somewhat overvalued in that sense. With respect to Chinese silver currencies and Japanese yen, the piastre no longer holds a link with these currencies; Table 7 shows that while Chinese silver currencies and Japanese yen as well as these combined with the rest of the currencies are found to be cointegrated, the piastre would not be cointegrated with any of these²⁵. The piastre is described as a stationary process (as indicated by the unit root tests results earlier), as opposed to nonstationary series of other exchange rates. Even after the French franc abandoned the gold standard in September of 1936, allowing the piastre to depreciate, lack of a link with other currencies was still the case. The Vietnamese currency failed to share not only a common deterministic (time) trend but also a stochastic trend with other currencies. Thus over the turmoil years during the 1930s, although other currencies remained to be linked through a long-run relationship, the piastre was left out of the intra-Asia trade and investment, and financial linkages. By pegging its currency to the French franc, Vietnam must have felt adverse effects of worldwide chaos magnified; losing international competitiveness and dropping its currency from a long-run relationship that prevents any one exchange rate in the system from getting too far out of the line. Such were the serious consequences for Vietnam with respect to its trading partners from the standpoint of interdependence among the economies.

Summary and conclusion

In the exchange rates of the piastre against western and Asian currencies, we could distinguish three sub-periods between the nineteenth century and 1954. Before the early 1910s, the integration of the piastre as a silver standard currency within South East Asian monetary system; around WWI, instability of the piastre in a context of shift towards the gold exchange standard in South East Asia and appreciation of the silver: after 1930, the adoption of a franc-peg (yen-peg during WWII). Differences in standard (silver vs. gold) before 1914 and financial turmoil between 1914 and 1930 explained the instability of the piastre-franc exchange rate and the lag of the official rate behind the market rate. As a silver currency, the piastre followed the trend of depreciation of the main silver standard trade partners (Hong Kong and China). After 1930, the peg on the French franc, changed the rules and amplified the volatility of the piastre against other Asian currencies.

During the 1920s, most top rank French civil servants in Indochina were hostile to this perspective and, in co-operation with ethnic Vietnamese who were civil officers in local administration, argued against a

²⁴ As the variations of some of the currencies in late 1920's are limited within the gold points, we also test for cointegration using the data for the period 1923-1926, the era of free floating. We do find evidence of cointegration.

²⁵ We obtain qualitatively similar results even when we do not include Hong Kong dollar, whose series were found to be stationary when a time trend is included in our unit root tests earlier.

monetary reform inducing an isolation of Indochina from the Asian context and trading networks. Our results of cointegration test of monthly exchange rates of the piastre and other Asian currencies provide evidence of the ineffectiveness of the franc-peg policy. The loss of piastre's long-run association with the rest of currencies in 1930 posits adverse consequences for intra-group trade, investment, and market integration. These results could be interpreted as a possible case where the negative impact of fixed exchange rates regime may be significant for a small open economy. They may also indicate that we should investigate further the consequences of fixed exchange rates in Asian countries before or during WWII, but also re-examine the attitude of East Asian countries regarding the Bretton-Woods agreement and the implications of the gradual implementation of the fixed exchange rates during the 1950s and 1960s. Further investigation of these issues may facilitate the understanding of the recent financial crisis in the region.

Table 1 Volatility of Indochinese piastre exchange rate against Western currencies - (French franc, 1913 gold-franc, sterling, US dollar).

	French franc (Paris)	French franc (Vietnam)	sterling	US dollar
1923	1.87	1.87	0.88	0.90
1924	4.26	4.32	0.54	0.49
1925	1.49	1.50	0.59	0.57
1926	4.43	4.50	1.17	1.09
1927	1.02	0.98	0.99	0.96
1928	0.51	0.52	0.48	0.51
1929	0.59	0.59	0.64	0.58
1930	0.31	0.28	0.31	0.30
1931	0.00	0.07	0.12	2.49
1932	0.00	0.08	0.20	1.07
1933	0.00	0.06	1.99	0.90
1934	0.00	0.10	0.65	0.56
1935	0.00	0.13	0.23	0.51
1936	0.00	0.11	4.43	4.00
1937	0.00	0.00	2.16	2.22
1938	0.00	0.00	1.10	1.15
1939	0.00	0.00	1.97	0.05
1940	0.00	0.00	0.00	0.00

Table 2 Volatility of Indochinese piastre exchange rate against East Asian currencies (Shanghai tael, Hong Kong dollar, Yunnan dollar, Japanese yen)

	Hong Kong dollar	Shanghai tael *	Yunnan dollar	Japanese yen
1923	0.36	0.27	0.79	0.98
1924	0.23	0.62	1.36	1.34
1925	0.65	0.67	3.31	1.15
1926	0.59	0.44	2.00	1.30
1927	0.43	0.55	0.00	1.06
1928	0.53	0.75	11.76	0.76
1929	0.69	0.23	5.27	0.76
1930	1.75	2.14	3.60	0.35
1931	2.44	2.64	2.45	0.66
1932	0.91	1.20	1.75	2.42
1933	0.86	4.36	1.66	1.26
1934	1.14	1.15	1.55	0.63
1935	4.70	2.89	2.33	0.54
1936	4.20	4.15	3.87	4.01
1937	2.11	2.10	2.04	2.14
1938	1.18	3.58	5.36	1.22
1939	0.40	6.21	8.85	0.08
1940	0.98	2.33	3.71	3.07

* Chinese dollar after 1933

Table 3 Volatility of Indochinese piastre exchange rate against Southeast Asian currencies (Siam baht, Indonesian guilder or rupiah, Straits dollar, Indian rupee).

	Siam baht (Thailand)	Indonesian guilder (rupiah)	Straits dollar (Singapore)	Indian rupee (India and Burma)
1923	1,07	0,92	0,86	1,00
1924	0,39	0,53	0,47	0,59
1925	0,59	0,61	0,59	0,56
1926	1,16	1,09	1,10	1,04
1927	0,92	0,92	2,23	0,89
1928	0,56	0,54	0,50	0,57
1929	0,62	0,60	0,61	0,54
1930	5,66	0,28	0,33	0,33
1931	0,33	0,18	2,62	2,72
1932	2,47	0,21	1,07	1,01
1933	0,95	0,16	0,82	0,87
1934	0,60	0,14	0,54	0,54
1935	0,52	0,15	0,53	0,50
1936	4,03	1,48	4,02	4,02
1937	1,97	2,13	2,18	2,20
1938	1,15	1,11	1,06	1,16
1939	0,09	1,81	0,11	0,06
1940	0,98	1,10	0,00	0,02

Table 4 Unit root tests on exchange rates – Inter-war period (1923:01-1940:12)

Currency	ADF ^a		Perron's test of unit root with endogenous time break ^b
	Without Time trend	With Time trend	
Piastre ^c	1.39	-0.99	-2.61
Hong Kong Dollar	-0.48	-2.95	-4.42
Shanghai Tael	1.57	-1.27	-3.40
Yunnan Dollar	0.15	-2.11	-3.99
Straits Dollar	-0.04	-2.13	** -8.22
Peso of the Philippines	-0.81	-2.03	** -19.42
Siam Baht	0.30	-2.19	** -7.79
Indonesia Rupiah	-0.85	-1.75	** -10.37
Indian Rupee	0.45	-2.02	** -6.52
Japanese Yen	-0.31	-1.74	** -7.59

All exchange rates are quoted against gold French franc-1913.

^a The ADF is the ADF t-statistic for the null hypothesis of a unit root.

^b The critical values are from Perron's "Further evidence on breaking trend functions in macroeconomic variables, Journal of Econometrics 80,1997.

^c Caution required in interpretation as the piastre was pegged to the French franc during the period 1930:01 – 1936:09.

** and * denote the 5% and 10% statistical significance levels, respectively.

Table 5 Unit root tests on exchange rates before the franc-peg in 1930

Before the peg (Period: 1923:01-1929:12)	ADF ^a		Perron's test of unit root with endogenous time break ^b
Currency	Without Time trend	With Time trend	
Piastre	1.43	0.10	-2.61
Hong Kong Dollar	0.40	-0.72	-4.10
Shanghai Tael	0.37	-1.33	-4.14
Yunnan Dollar	0.52	-0.95	-4.36
Straits Dollar	-1.07	-1.27	** -7.30
Peso of the Philippines	** -5.78	** -6.32	** -7.38
Siam Baht	-1.38	-2.25	** -8.19
Indonesia Rupiah	-1.11	-1.34	** -7.83
Indian Rupee	-1.28	-0.49	** -9.10
Japanese Yen	-1.73	-1.96	-4.72

All exchange rates are quoted against gold French franc-1913.

^a The ADF is the ADF t-statistic for the null hypothesis of a unit root.

^c The Piastre was pegged to the French franc for the period 1930:01 – 1936:09. Thus for the piastre, tests were conducted over the sample excluding that period.

^b The critical values are from Perron's "Further evidence on breaking trend functions in macroeconomic variables", Journal of Econometrics 80,1997.

** and * denote the 5% and 10% statistical significance levels, respectively.

Table 6 Unit root tests on exchange rates after the franc-peg in 1930

After the peg (Period: 1930:01-1940:12)	ADF ^a		Perron's test of unit root with endogenous time break ^b
Currency	Without Time trend	With Time trend	
Piastre (1936:10-1940:12) ^c	** -3.69	** -3.93	-3.90
Hong Kong Dollar	-2.08	* -3.34	-4.83
Shanghai Tael	0.33	-1.27	-4.69
Yunnan Dollar	0.27	-1.39	-4.22
Straits Dollar	-1.29	-2.13	** -7.01
Peso of the Philippines	-1.33	-1.79	** -18.01
Siam Baht	-0.89	-2.21	** -6.10
Indonesia Rupiah	-0.83	-2.43	** -20.36
Indian Rupee	-1.21	-1.84	** -6.71
Japanese Yen	-1.49	-1.36	** -6.31

All exchange rates are quoted against gold French franc-1913.

^a The ADF is the ADF t-statistic for the null hypothesis of a unit root.

^c The Piastre was pegged to the French franc for the period 1930:01 – 1936:09. Thus for the piastre, tests were conducted over the sample excluding that period.

^b The critical values are from Perron's "Further evidence on breaking trend functions in macroeconomic variables", Journal of Econometrics 80,1997.

** and * denote the 5% and 10% statistical significance levels, respectively.

Table 7 Cointegration tests for systems of Asian currencies

System of currencies	Sample period	Trace statistic		λ -max statistic	
		$H_0: r=0$	$H_1: r \leq 1$	$H_0: r=0$	$H_1: r=1$
1, 2, 3	1923:01-1929:12	19.71	5.78	13.93	5.46
1, 2, 3, 10	1923:01-1929:12	42.44	17.18	*25.26	12.83
1, 2, 3, 5, 7, 8, 9, 10	1923:01-1929:12	**196.58	**136.94	**59.64	**45.33
1, 2, 3, 5, 7, 8, 9, 10	1923:01-1926:12	**224.11	**162.93	**61.19	45.68
2, 3, 4	1930:01-1940:12	**36.26	9.01	**27.25	8.77
2, 3, 4, 10	1930:01-1940:12	*46.26	14.13	**32.12	9.36
2, 3, 4, 5, 6, 7, 8, 9, 10	1930:01-1940:12	**253.51	**179.07	**74.44	**58.34
2, 3, 4, 5, 6, 7, 8, 9, 10	1936:10-1940:12	**348.54	**236.53	**112.01	**62.38

All exchange rates are quoted against gold French franc-1913.

The currency codes are: 1=Piastre, 2=Hong Kong dollar, 3=Shanghai Tael,

4=Yunnan dollar, 5=Straits dollar, 6=Peso of the Philippines,

7=Siam Baht, 8=Indonesian rupiah, 9=Indian Rupee, 10=Japanese Yen.

For the sample 1923-1930, Yunnan dollar is not included in the system because of a dramatic structural change in 1928.

For the sample 1930-1940, the piastre exchange rate series is found to be stationary (i.e., the piastre was on de facto gold standard between 1930 and 1936 and followed stationary process as indicated by results from Table 6) and thus cannot be cointegrated with other nonstationary variables. For 1930-1940, we also conduct cointegration tests on systems without including Hong Kong dollar, whose series were found to be stationary when a time trend is included in our unit root tests earlier. Results are qualitatively similar.

^a The ADF is the ADF t-statistic for the null hypothesis of a unit root.

^b r is the number of cointegrating vectors in the system.

The critical values of the trace and λ -max statistics can be found in Osterwald-Lenum (1992).

** and * denote the 5% and 10% statistical significance level, respectively.

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