

2013 | 02

Working Paper

Norges Bank's Bicentenary Project

Financing Japan's World War II occupation of Southeast Asia

Gregg Huff and Shinobu Majima

Working papers fra Norges Bank, fra 1992/1 til 2009/2 kan bestilles over e-post:

servicesenter@norges-bank.no

Fra 1999 og senere er publikasjonene tilgjengelige på www.norges-bank.no

Working papers inneholder forskningsarbeider og utredninger som vanligvis ikke har fått sin endelige form. Hensikten er blant annet at forfatteren kan motta kommentarer fra kolleger og andre interesserte. Synspunkter og konklusjoner i arbeidene står for forfatterens regning.

Working papers from Norges Bank, from 1992/1 to 2009/2 can be ordered by e-mail:

servicesenter@norges-bank.no

Working papers from 1999 onwards are available on www.norges-bank.no

Norges Bank's working papers present research projects and reports (not usually in their final form) and are intended inter alia to enable the author to benefit from the comments of colleagues and other interested parties. Views and conclusions expressed in working papers are the responsibility of the authors alone.

Financing Japan's World War II Occupation of Southeast Asia

Gregg Huff and Shinobu Majima

*Pembroke College
University of Oxford
Oxford OX1 1DW, England
gregg.huff@pmb.ox.ac.uk*

*Faculty of Economics,
Gakushuin University
1-5-1 Mejiro, Toshima-ku,
Tokyo 171-8588, Japan
shinobu.majima@gakushuin.ac.jp*

This paper analyzes how Japan financed its World War II occupation of Southeast Asia, the transfer of resources to Japan, and the monetary and inflation consequences of Japanese policies. In Malaya, Burma, Indonesia and the Philippines, the issue of military scrip to pay for resources and occupying armies greatly increased money supply. Despite high inflation, hyperinflation hardly occurred because of a sustained transactions demand for money, because of Japan's strong enforcement of monetary monopoly, and because of declining Japanese military capability to ship resources home. In Thailand and Indochina, occupation costs and bilateral clearing arrangements created near open-ended Japanese purchasing power and allowed the transfer to Japan of as much as a third of Indochina's annual GDP. Although the Thai and Indochinese governments financed Japanese demands mainly by printing large quantities of money, inflation rose only in line with monetary expansion due to money's continued use as a store of value in rice-surplus areas.

JEL classification: G01, N15, N45, P44

Keywords: war, financial and macroeconomic crises, resource transfer, occupation costs, bilateral clearing arrangements, seigniorage, hyperinflation, Greater East Asian Co-Prosperity Sphere, Japan, Southeast Asia

Financing Japan's World War II Occupation of Southeast Asia

Although the 7 December 1941 attack on Pearl Harbor was a gamble, by April 1942 the Japanese military had occupied Southeast Asia's six main countries of Burma, Thailand (Siam), Malaya (including Singapore), Indonesia, Indochina and the Philippines. Southeast Asia — known in Japan as the Southern Regions — covered 1.7 million square miles and had a population of some 140 million, almost double that of Japan. It offered food and raw materials, above all petroleum, essential to the Japanese war economy. But Japan lacked foreign exchange, or even goods, to pay for imports from Southeast Asia. Moreover, invading Japanese forces were unique in modern military history in their strategy of self-sufficiency from the outset.¹ Southeast Asians would have to support Japan's military.

Japanese policy was clear well before occupation. 'We will have', Finance Minister Kaya Okinori explained in November 1941, 'to pursue a so-called policy of exploitation'. Japan must 'adopt a policy of self-sufficiency in the South, keep the shipment of materials from Japan to that area to the minimum amount necessary to maintain order and to utilize labor forces there, ignore for the time being the decline in the value of currency and the economic dislocations that will ensue from this, and in this way push forward'.²

This paper utilizes new data to try to achieve two main aims. One is to identify resource transfers to Japan and analyze how these were exacted and financed through occupation costs (payments to the occupier), the use of military scrip (unbacked military notes), and the institution of bilateral clearing arrangements. Second, we attempt to quantify the monetary and inflationary consequences of Japanese financial policies for Southeast Asia.

No previous work has tried to measure wartime financial exploitation in Southeast Asia. Even for Europe during World War II, transfers to Germany are only now becoming a

¹ Hata, 'Continental expansion', p. 302.

² Japan, Imperial Headquarters, Nampō Senryōchi Gyōsei Jisshi Yōkō, presented at the Imperial Conference, 5 November 1941, in Kishi Collection B1-224. Kaya repeated these same policies at the Imperial Conference on 1 December when Japan took the formal decision for war.

research area.³ A path-breaking article by Occhino, Oosterlinck and White shows a 1943 transfer to Nazi Germany of a staggering 55.5% of French GDP.⁴ Japanese exploitation, constrained by Japan's having little use for many Southeast Asian commodities and its lack of merchant shipping, fell short of Nazi levels. Nevertheless, throughout Southeast Asia exploitation was substantial and for Indochina reached over a third of that country's GDP.

Payments to Japan and the transfer of goods there were largely financed by high rates of growth of money supply. We argue that throughout Southeast Asia, Japanese coercive powers and the usefulness of money as a medium of exchange were important mechanisms in limiting inflation. Moreover, in the great Southeast Asian rice-producing countries of Thailand and Indochina, the continued willingness of peasant rice growers to hold Japanese notes as a store of value kept inflation multiples close to those of money supply increase. In Southeast Asia, hyperinflation appeared only late in the war.

Eight sections comprise the remainder of this paper. The next section identifies two patterns of military occupation and the monetary arrangements associated with each. In the second section, we measure payments to Japan, show how they were financed, and evaluate the fit between Southeast Asian productive capacity and Japan's wartime needs. A third section sets out a model of money demand and seigniorage — the ability of government with a monetary monopoly to finance expenditure by issuing money — to assess Japanese finance and financial policies in Southeast Asia. The fourth section quantifies drastic wartime declines in Southeast Asian GDP, along with Japan's increasing need for war finance, and considers both in light of the model. Trends in money supply growth and inflation are traced in the fifth section, while the sixth and seventh sections assess reasons for a surprisingly high willingness of Southeast Asians to hold real balances and be taxed through inflation. A final

³ Main studies of this German exploitation are Milward, *New order, Fascist economy and War, economy* and, recently and in revealing detail, Occhino, Oosterlinck and White, 'How occupied France' and 'How much'.

⁴ Occhino, Oosterlinck and White, 'How much', p. 7. For analysis of war finance, see Neal, 'Introduction'.

section places Japanese war finance in the wider context of the economics of a Greater East Asia Co-Prosperty Sphere.

OCCUPATION PATTERNS, BANKING, EXCHANGE RATES, AND SCRIP

Two patterns of occupation administration obtained. In Thailand and Indochina, occupation was mediated through pre-war governments — a Thai-run government in Thailand and the French colonial administration in Indochina. These governments were left to determine how to pay for resource transfers to Japan. By contrast, Malaya, Burma, Indonesia and the Philippines fell under military administration.

After occupying Southeast Asia, among Japan's first acts was to revalue the yen and set a unit of each of Southeast Asia's currencies equal to one yen. Compared to 1937 exchange rates, the yen gained in value by between 35% and 101% against Southeast Asian currencies. Goods in Southeast Asia were made cheap for Japan.

During World War II, Japan, unlike Germany, did not try to maintain and make use of the banking structure in occupied territories.⁵ Throughout Southeast Asia, pre-war banks associated in any way with Allied countries were shut down. This meant the closure, and eventual liquidation, of almost all European banks. Since these banks had dominated pre-war banking, deposit banking in Southeast Asia was largely eliminated.⁶ Although Asian banks were allowed to re-open during 1942 and 1943, they did relatively little business, except in Thailand, which was allied with Japan.⁷ The Yokohama Specie Bank became the Japanese government's agent in Southeast Asia and the vehicle through which the military and Ministry of Finance in Tokyo organized banking.

Money in Thailand and Indochina continued to be issued by pre-war monetary authorities. For the rest of Southeast Asia, Japan printed military scrip, beginning possibly as

⁵ Bloc and Hoselitz, *Economics*, p. 61.

⁶ United States, Office of Strategic Services, *Japanese financial programs*, pp. 227-28; United States, Office of Strategic Services, *Japanese administration in Malaya*, p. 28; United States, Office of Strategic Services, *Malaya: political and economic changes affected by the Japanese*, pp. 30-31.

⁷ Thailand, *Report 1941-1950*, p. 56; Emery, *Financial institutions*, pp. 567-68.

early as January 1941.⁸ Scrip, literally campaign money given to Japan's invading forces, was legal tender only in the occupied territories. With 'appropriate' pictures — banana plants for Malaya and Indonesia, pagodas for Burma — scrip looked quite different from pre-war notes. It incorporated 'none of the refinements of the Japanese-sponsored currencies in North and Central Occupied China'.⁹ Print quality was, the Japanese acknowledged, 'appalling' and it deteriorated as the war continued.¹⁰ Before then, however, Japan's occupation currencies attracted derisive names: 'banana money' in Malaya and Indonesia, 'Mickey Mouse money' in the Philippines.

In military-administered Southeast Asia, the Yokohama Specie Bank, and in the Philippines the Bank of Taiwan, soon replaced the military for the issue of scrip. A specialist bank, the Southern Regions Development Bank, was set up to finance long-term resource development in Southeast Asia. However, when insufficient Southeast Asian economic development materialized to afford the Bank a meaningful role, it took over the issue of scrip.

The Southern Regions Development Bank started issuing scrip in April 1942, although in some areas not until 1943. Notes remained identical to those used by the military and the Yokohama Specie Bank and were still printed in Tokyo.¹¹ Like the Yokohama Specie Bank, the Southern Regions Development Bank functioned as a no more than a conduit through which currency passed on its way to the military and into circulation.¹²

Over the first year or so of the war in the military-occupied countries, pre-war colonial currencies were allowed to circulate at par alongside Japanese military scrip. Some foreign currencies also circulated, for example the US dollar in the Philippines.¹³

⁸ Shibata, *Senryōchi Tsuka*, p. 532; Shimazaki, *En no Shinryaku*, pp. 364-394; Longmuir, *Money trail*, p. 32

⁹ King, *Money*, p. 23.

¹⁰ Japan, Southern Area Military Administration, *Sōchō Shi No. 23 (Withdrawal of Money)*, p. 7.

¹¹ Shibata, 'Monetary policy', p. 712.

¹² Swan, 'Thai-Japan relations', pp. 320-21; Cohen, *Japan's economy*, pp. 95-96; Ránki, *Economics of the Second World War*, p. 303; United States, Office of Strategic Services, *Control of inflation in Japan*, pp. A41-A42; United States, Office of Strategic Services, *Japanese financial programs*, p. 238.

¹³ United States, Office of Strategic Services, *Japanese financial programs*, pp. 215-16, 237; Cribb, 'Political dimensions', p. 114; Longmuir, *Money trail*, p. 125; Romualdez, 'Financial problems', p. 460.

Subsequently, however, scrip drove colonial monies from open circulation through a combination of the operation of Gresham's Law that bad money drives out good and, as later discussed, because of strong Japanese coercion beginning around late 1942.

PAYMENTS AND TRANSFER OF GOODS TO JAPAN

The mechanism by which the Japanese transferred resources to themselves through the use of scrip in Malaya, Indonesia, the Philippines and Burma involved nothing more than printing the required amount of currency. Acquiring currency to spend in Thailand and Indochina was a more complicated process. However, as this section shows, the effect was like issuing scrip, since in exchange for local Thai or Indochinese currency Japan gave no money or credits convertible into tangible goods. This section goes on to identify large Southeast Asian payments to the Japanese and the need to finance these by money creation.

Occupation costs, bilateral clearing arrangements and yen credits

Japan used baht in Thailand and piastres in Indochina to buy goods it exported and to meet local military and administrative (occupation) costs. When Japanese officials, after some negotiation with the Thai or Indochinese governments, specified currency requirements, the Yokohama Specie Bank credited at the Bank of Japan in Tokyo the accounts of the Bank of Siam (established in December 1942) or Banque de l'Indochine with the yen equivalent of baht or piastres to be given to Japan. These Southeast Asian 'central banks' then credited the Yokohama Specie Bank in Bangkok or Saigon with local currency for military use.¹⁴

Yen credited to Thailand and Indochina were 'special' yen. They could not be spent in Japan nor used to purchase imports from Japan. Thailand did, however, succeed in reaching an agreement for some 10% of its yen credits to be converted into gold held in Tokyo.

¹⁴ Bank of England OV25/9 Extract from Bangkok Times 'Japan-Thailand economic co-operation. New agreement now signed. The system of settlement' 4 May 1942; Thailand, *Report 1941-1950*, p. 55; Centre des Archives d'Outre-Mer, Aix-en-Provence (AOM) 1Affeco/289, Franco-Japanese accords: 'Modalities d'application de l'échange de lettres, 1942' and 'Note: Négociation d'un nouvel accord financier entre l'Indochine et le Japon', Vichy, 23 December 1942.

Although occupation costs typically exceeded actual military and administrative costs, bilateral clearing agreements negotiated with Thailand and Indochina were potentially an even more powerful means of extraction. They gave Japan purchasing power in Thailand and Indochina that was in essence limited only by the physical capacities of the two countries to provide goods and services for Japan; by how far Japan could in fact use goods from the two countries; and by the availability of shipping to carry goods.¹⁵ As such, bilateral agreements suited not just wartime finance but Japan's long-term goals of integrating Southeast Asia into the yen bloc and creating an empire in East Asia.

Payments to Japan

The largest payments and goods sent to Japan were from Thailand, Indochina and Indonesia. These are also the countries for which wartime national income estimates allow quantification of transfers to Japan as a share of GDP (table 1). For all three countries, exploitation was substantial at arbitrary, wartime exchange rates. It was much greater at 1937 rates which proxy market rates. Between 1942 and 1945, Thailand's payments averaged 6% of GDP at wartime rates and a little over 9% at 1937 rates. Payments made by Indochina rose from 9.1% of GDP in 1942 to 25.4% by 1945, equivalent to over a third of GDP at 1937 exchange rates. Large Indochinese payments, probably the biggest in Southeast Asia, are explained by Indochina's role as Japan's principal military and logistical base in Southeast Asia; by Indochina's position as the second main Japanese source (just behind Korea) of rice imports; and by successful Japanese manipulation of the pro-Vichy colonial government.¹⁶

Payments from Indonesia fell sharply, after reaching 11.2% of GDP in 1943, or nearly twice that at pre-war rates. The fall reflected the fact that Japan's chief use for Indonesia was to extract petroleum, and that by 1944 its shipment to Japan had become difficult. During

¹⁵ Wiwat, *Wiwatthanachaiyanuson*, pp. 399- 402; United States, Office of Strategic Services, *Financial relations between Siam and Japan*, p. 6.

¹⁶ Robequain, *Economic development*, pp. 367-73. By 1942, Japan almost completely controlled Indochina surpluses. See also, Decoux, *A la barre de l'Indochine*, pp. 440-50.

1944 American submarine and air attacks reduced Japanese merchant shipping to 40%, and in 1945 to under a quarter, of its 1941 tonnage.¹⁷ In 1944, the inability to move refined products home or to war zones caused Japan to limit oil refinery operations in Southeast Asia; the last Japanese tanker convoy for Japan left Singapore on 19 March 1945.¹⁸ Without oil Japan did not have airplanes; that gave the Allies open bombing targets.

During the war, the composition of Thai and Indochinese payments to Japan altered radically as Japan both lost control of Pacific shipping lanes and increased Japanese military expenditure and troops in Southeast Asia against apparent near certainty of Allied invasion. Initially, available merchant shipping and Japan's war needs at home, mainly for rice, made trade surpluses the chief component of payments (table 2). By the last two years of the war, however, occupation costs comprised over 90% of payments as Japan's emphasis shifted towards the defence of Southeast Asia.

A number of resource transfers from Southeast Asia to Japan can not be reliably quantified and the payments shown in table 1 are a lower bound of total transfers. Plunder was not especially great but included, for example, four months' supply of crude oil from Indonesia and about 150,000 tons of rubber from Malaya.¹⁹ Looting was significant in regard to all types of transport. Quantities of railway rolling stock and rails were taken from around Southeast Asia, especially from Malaya, to build the Siam-Burma railway.

A high proportion of Southeast Asians did at least some 'voluntary' work towards the Japanese war effort and large numbers were co-opted as forced labour. Among the most egregious instances were many of Indonesia's some 2.6 million *romusha* (volunteers) and some 166,000 Asians who worked on the Siam-Burma railway. Its construction cost approximately 66,000 Asian and 14,000 European POW lives, 320 persons per mile of track

¹⁷ Yoshio, *Kindai nihon keizai shi yoran* (Handbook of modern Japanese history), p. 139; see also, United States Strategic Bombing Survey, *Effects of strategic bombing*, pp. 41-44.

¹⁸ United States Strategic Bombing Survey, *Oil in Japan's war*, pp. 6, 49.

¹⁹ Milward, *War, economy*, p. 165.

laid. Payment at less than market wages of a proportion of those working for the Japanese were a tax, as were forced deliveries of food, mainly rice in Indonesia and Indochina, at below market prices. Overall, probably at least five million Southeast Asian civilians died prematurely as a result of the Japanese occupation. While their lives could be valued and a cost assigned, this was not a payment or transfer to Japan, and in any case the meaning of such quantification seems doubtful.

Why weren't payments from Southeast Asia larger?

Although the payments in table 1 constitute a lower bound for total resource transfers to Japan, these seem unlikely anywhere in Southeast Asia to have approached the 1943 high point of over 50% of GDP that Nazi Germany extracted from France. Even in Indochina, Japan was unable to achieve exploitation on the scale envisaged.²⁰ There were three main reasons for the comparatively smaller payments from Southeast Asia to Japan than France to Germany, none of them financial. First, Southeast Asia was a collection of highly specialized monoeconomies. Pre-war Southeast Asia exported just four main commodities — rice, rubber, tin and sugar — to the global (chiefly Western) market. The region produced these commodities in far greater quantities than Japan could use. Japan's annual wartime requirement for rubber of 75,000 tons was less than 7% of combined Malayan and Indonesian rubber exports in 1940. No Southeast Asian country was more than half self-sufficient in textiles; none among the region's group of minimally industrialized economies had a manufacturing base able to contribute industrial goods needed by Japan's war economy.

Second, as discussed above, even for those Southeast Asian commodities that Japan could use, by 1944 there were severe shortages of merchant shipping to transport these goods. Third, Japan's rapid initial conquests boxed it into diverting resources to the defence of military or strategic areas over much of Southeast Asia's 1.7m square miles even though they

²⁰ For discussion of this, see MAGIC, 'Economic value of Indochina to Japan' 5 July 1944, pp. 13-16. MAGIC are wartime Japanese diplomatic messages intercepted and decoded by the Allies.

supplied few, if any, goods to Japan. The main Japanese interest in Burma was to close the Burma Road as a supply route to Chiang Kai-shek's Nationalist army and as a defensive perimeter protecting Thailand. Japan obtained virtually no goods from Burma but had 185,149 soldiers die there, a twelfth of Japanese losses in the war as a whole.²¹ Singapore was key for strategic control of the Pacific, not for Malayan rubber. The Philippines was primarily important to secure shipping routes between Southeast Asia and Japan.

Over the course of the war, Japan secured relatively little from Southeast Asia. Between 1942 and 1945 Japanese trade statistics show a trade surplus with Southeast Asia of 764.8 million yen. That compares to occupation costs of 1,498 million yen paid by Indochina from 1942 to 1945 and 1,393 million yen paid by Thailand. From 1942 to 1944, trade surpluses with Southeast Asia amounted to four tenths of a percent of Japan's GDP.²²

Financing payments

War can be financed by selling bonds at home or internationally, through taxation, and by printing money. In Southeast Asia, the Japanese relied heavily, and increasingly, on money creation and its associated seigniorage. Table 3 details this for Thailand and Indochina. During the war, in both countries increases in government revenue lagged well behind inflation. Conventional government expenditure alone gave rise to modest budget deficits and these plus, in effect, additional wartime government spending for occupation costs and trade surpluses with Japan created large gaps between government total spending (conventional spending plus payments to Japan) and government revenue. Printing more currency, measured in table 3 by the annual change in money supply, largely filled the gap. From 1943 onwards in each of the two countries, money financed half to three quarters of total government spending. The share of money in government finance was almost certainly as large, and probably larger, in the four militarily-administered Southeast Asian countries,

²¹ Allen, 'Burma', p. 301.

²² Japan, *Return of foreign trade*, 1941-1944-48.

since exploitation of occupied countries, whether realized through taxation or monetary expansion, is typically maximized when governments are left in place.

Even if Japan had not favoured the ‘direct means’ of selling special yen and issuing scrip, alternatives to this financing of expenditure through money creation were limited. Neither the Thai and Indochinese governments nor Japanese military administrations had any possibility of borrowing internationally. Although in Japan war finance relied primarily on making financial institutions buy government bonds, nowhere in occupied Asia was their sale attempted to more than a very limited extent.²³ In Southeast Asia, the elimination of most of the pre-war banking structure and lack of any real market for government paper would have made bond sales difficult. Governments did, however, introduce many new taxes and, as in Japan, use savings campaigns to try to raise finance.

The wartime collapse in exports and per capita income largely destroyed pre-war Southeast Asian tax structures.²⁴ Governments and Japanese administrators made considerable efforts to replace these in order to limit money creation. Both the Asian news media and Allied intelligence describe numerous saving schemes, for example in March 1944 a ‘gigantic saving campaign’ in Malaya.²⁵ Taxes included ‘voluntary’ gifts, levied mainly on Chinese businessmen, lotteries, and taxes on gambling, amusement parks, cockpits, bicycles, hand carts, taxi dancers, restaurants and coffee shops, the last three associated with the great wartime upsurge in prostitution.

Japanese lack of interest in bond finance was not, however, entirely shared by Southeast Asian governments which, beginning in 1943, looked to soak up excess purchasing power and restrict inflation. Doubts over the viability of bond sales in Indochina, and the advisability of their limited use, were confirmed by experience in Burma.²⁶ In August 1943,

²³ Cohen, *Japan's economy*, pp. 88-90; United States, Office of Strategic Services, Research and Analysis Branch, *Control of inflation in Japan*, p. A42; United States, Strategic Bombing Survey, *Effects of strategic bombing*, p. 91

²⁴ Japan, Southern Area Military Administration, *Sōchō Shi No. 6 (Inflation in Sumatra)*, p. 39.

²⁵ United States, Office of Strategic Services, *Japanese financial programs*, p. 211.

²⁶ Le Manh Hung, *Impact*, p. 244.

bonds issued by the puppet Ba Maw government went on sale in Rangoon and rural areas. While the local press hailed the issue as a great success, the absence of further issues suggests otherwise.²⁷ Thailand's government issued 30m baht of 3% saving bonds in 1944. It also gave bonds at 1% interest to compensate for the February 1945 demonetization of 1,000 baht notes.²⁸ The main example of bond finance was in the Philippines. The pre-war state-owned Philippine National Bank was not liquidated and could be made to purchase most of a substantial amount of Puppet Republic bonds issued by the Laurel government.²⁹ However, with the partial exception of Philippine bonds, none of the wartime Southeast Asian saving, taxation or bond schemes went far towards reducing the need to finance through money.

A MODEL OF SEIGNIORAGE AND INFLATION

The model in this section links money demand and inflation to help analyze, in the remainder of the paper, why in Southeast Asia there was considerable risk of high inflation becoming hyperinflation and why Japan faced increasing difficulty in obtaining seigniorage to finance military expenditure. In the model, derived from the work of Michael Bruno, the demand to hold money balances is expected to decline with inflation. Because of this, a military administration or government reliant on finance through printing money could easily trigger a hyperinflationary spiral.³⁰ Under the restricted banking regime of wartime Southeast Asia, the aggregate money stock, M , closely approximated the nominal money base, H . In Southeast Asia, this base divided by the price level, P , are real money balances, $h = H/P$. Recognising the effect of inflation on the willingness to hold money, a modified quantity theory demand for money function is:

$$h = kY - b\pi \quad (1)$$

²⁷ Burma Intelligence Bureau, *Burma*, pp. 108-9.

²⁸ Wiwat, *Wiwatthanachaiyanuson*, p. 91; Thailand, *Report 1941-1950*, p. 53.

²⁹ Romualdez, 'Financial problems', p. 459; United States, Office of Strategic Services, *Japanese financial programs*, pp. 245-46.

³⁰ Bruno, 'High inflation'; And Bordo and Jonung, *Long-run* for a comprehensive study of money velocity.

where k takes account of the transactions and store of value motives for holding scrip; Y is national income, and b measures the inflation responsiveness of the demand for real balances.

Figure 1 plots this money demand function and inflation, $\pi = \dot{P}/P$. Available seigniorage, d , to finance military and government administrative expenditure is real money balances times the inflation rate:

$$d = h\pi \quad (2)$$

If inflation broadly mirrors the percentage increase in money base ($\dot{H}/H \approx \dot{P}/P$ as is consistent with the steady state in which $\dot{H}/H = \pi$), seigniorage is a constant multiple of vertical times horizontal and therefore a rectangular hyperbola. In figure 1, the rectangular hyperbola passing through ABd represents a given amount of seigniorage and an amount greater than that represented by $A'B'd'$. If real balances are H/P , then $\dot{H}/H * H/P \approx \dot{H}/P$ — an increase in the growth of the nominal base acts to reduce real base money.

The curve (line) $ABB'h$ in figure 1 traces the real money demand function (equation 1) and B is a stable equilibrium. That is, if inflation jumps temporarily above its value at B , the ‘necessary’ level of real balances (to continue to extract the same amount of seigniorage) is less than the public’s willingness to hold money — the hyperbola is to the left of the demand function above B . Equilibrium returns to B as Southeast Asians reduce spending and attempt to re-build real balances. Below point A for a military administration or government to obtain the required rate of seigniorage, d , the ‘inflation tax’ — a tax on holding money balances measured as the rate of inflation (the tax rate) times real money balances (the tax base) — more than compensates for the erosion of real money balances, h .

Rightwards shifts of the dd curve (an increase in required seigniorage) or leftwards shifts in the money demand function will cause the equilibrium point B to move upwards and towards higher inflation. As drawn, the money demand function (equation 1), would shift left following a decline in national income and consequent reduction in the transactions

demand for money. Similarly, reports of Japanese war reversals would discourage the holding of scrip as a store of value. If price rises are correctly anticipated, the coefficient b in equation (1) incorporates the equilibrium response of Southeast Asians to expected (and actual) inflation. However, increased *uncertainty* about the future inflation rate, perhaps linked to military news or rumour could be built into the model. Talk of Japanese military defeats would tend to increase the responsiveness of the demand for real balances to inflation.

At point A equilibrium is unstable: a jump in inflation above A and towards A' causes the public's holdings of real balances to fall below the level needed to extract the same resources, shown by money demand $ABB'h$ — the hyperbola is now to the right of the real balance demand schedule above A. Suppose the authorities in Southeast Asia initially started by extracting seigniorage d' shown by the dotted hyperbola and with an initial stable equilibrium at B'. Increased extraction of seigniorage in response to military requisition would cause inflation to rise towards B on an outward shifting hyperbola. A continued rightwards drift of the hyperbola would cause points A and B to merge at a tangency to the money demand function. Here instability obtains; if the public continues to off-load money inflation takes off and hyper-inflation is in prospect. To avoid this outcome, government must introduce stabilization measures that reduce required seigniorage (the hyperbola moves back to the left) or bolster the demand for money (the $ABB'h$ curve moves rightwards).

SOUTHEAST ASIAN GDP AND FINANCE FOR OCCUPATION AND WAR

For high inflation regimes, the usual assumption is that 'wealth in real terms and real income seem to be relatively stable during hyperinflation'; near stability, Phillip Cagan goes on to point out, is necessary to make valid 'the hypothesis that changes in real cash balances in hyperinflation result from variations in the expected rate of change in prices'.³¹ The first part of this section shows that, contrary to stable real incomes, occupied Southeast Asia experienced large income falls. These almost certainly put strong leftwards pressure on the

³¹ Cagan, 'Monetary dynamics', pp. 31-33.

money demand curve in figure 1. The remainder of the section describes Japan's increasing need to raise finance in Southeast Asia as the war outlook worsened. Since Japanese war finance relied chiefly on money and associated seigniorage, this would have led to rightwards shifts in the dd curve in figure 1.

Wartime Southeast Asian GDP

In World War II Southeast Asia, 'Economic life receded from modernity'; countries retreated 'toward an isolation and autarchy that harked back to precolonial times'.³² Data for real per capita GDP, although incomplete and partly reliant on informed estimation, accord closely with this judgement. They point to one of the deepest macroeconomic crises in modern history (table 4).³³ After 1941, real per capita income in Indonesia and Indochina fell continuously. By 1944 in both countries, it was only somewhat over half, and in 1945 under half, of 1938 levels. Between 1938 and 1946, income in the Philippines shrank by more than half. The combined index of Philippines physical production fell by over three fifths.³⁴

No GDP data exist for Malaya, but over the course of the war GDP probably fell by at least half and perhaps more. The pre-war Malayan economy depended heavily on rubber and tin produced for export. Output of both commodities dropped precipitately. By 1942, rubber production was about a quarter of its 1937-39 average. In 1942, tin output slumped to a third of the 1937-39 level, recovered somewhat in 1943 but in 1944 was only 17.5% of late 1930s levels. Rubber and tin became largely unsaleable except for Japanese buying.

Thailand was the Southeast Asian economy least affected by war and occupation. Until 1945, per capita GDP was at most about 10% less than in 1938. Even in 1945, income was a comparatively modest 17.4% lower than the 1938 benchmark. Thailand apart, population increase in Southeast Asia did little, if anything, to maintain wartime GDP by

³² Bastin and Benda, *History*, p. 127.

³³ For comparative macroeconomic crises, see Barro and Ursúa, *Macroeconomic crises since 1870*.

³⁴ Spencer, *Land*, p. 223; Steinberg, 'Ambiguous legacy', p. 180.

offsetting per capita income falls; widespread malnutrition, famines in Vietnam and Indonesia, and severe economic dislocation checked, or often reversed, population growth.

Japanese needs for finance

Almost as soon as Japan had completed the occupation of Southeast Asia, the battles of the Coral Sea in May 1942 and Midway in June 1942 put the Japanese military under pressure. After mid-1943 and following further Japanese losses, the war entered a new phase in Southeast Asia as Japan began a strengthening of defences that continued for the remainder of the war. In June 1944, battles in the Philippine Sea and the loss of Saipan, which breached the inner line of Japanese defences, gave further impetus to the construction of military installations and troop deployments to counter anticipated Allied invasion of Southeast Asia.

The systematic destruction of Japanese shipping and Japan's continuously shrinking defensive perimeter in the Pacific, which necessitated the military build-up in Southeast Asia, had two main financial effects. One was the need for increased revenue, obtainable through seigniorage in the military-administered countries, to pay for local labour and materials. Between late 1943 and early 1944, severe labour shortages developed as Japan recruited Southeast Asians to erect coastal defences, build airfields and so forth. As early as October 1943, the construction of facilities like ports and airbases was said to account for Malaya receiving more military money than other occupied countries in the region and causing a price spiral.³⁵ In Indochina, the biggest single item in a large budgetary increase for the first six months of 1944 was the construction and equipment of airfields. Expenditure escalated during 1944 and even more in 1945.³⁶

³⁵ Japan, Southern Area Military Administration, *Problem of Currency*, p. 9, Reprint, p. 61.

³⁶ MAGIC, 'Budget for Japanese military expenses in French Indo-China for January-June 1944', 23 December 1943; MAGIC, 'Excerpts from 7 June report by Ambassador Yamamoto on situation in Thailand', p. A4; National Archives, Kew, FO 371/53959 'Second report on Japanese financial manipulations' by Lt. Col. Sweeny

Second, the military-induced expansion of wage labour to construct defences increased the demand of Southeast Asians for money to buy food and other necessities.³⁷ At the same time as the greater Japanese need for seigniorage must have shifted rightwards the dd curve in figure 1, larger defence expenditure exercised a rightwards influence on the money demand curve and helped to offset the inflationary effects of Japanese war finance.

MONEY SUPPLY AND INFLATION IN SOUTHEAST ASIA

Data sources

Money supply data, described in the appendix, derive mainly from official Japanese records kept by the Ministry of Finance in Tokyo and for Thailand and Indochina from government records. For almost the whole of the war data are reliable. Near its end, however, in militarily-occupied countries Japanese record keeping deteriorated or ceased and some data depend on Allied reconstruction.³⁸ Statistics are typically monthly for the four military-administered countries and annual for Thailand and Indochina. Data for the Philippines exist through January 1945, for Indonesia until July 1945, and for Malaya and Burma until 12 and 15 August 1945 respectively. Rapid money supply expansion during the war's last two months, and especially its final two weeks in August when surrender was inevitable, makes Malayan and Burmese data not entirely comparable with that for Indonesia and the Philippines.

Money supply and inflation

Table 5 shows the monetary and inflation characteristics of the Japanese occupation. Contrasting patterns between Thailand and Indochina and the four military-administered Southeast Asian countries are evident, both in the magnitude of inflation (lines 1, 4, 7 and 9) and the quantity of currency issued (lines 2 and 5). Although the Japanese instituted

³⁷ Kratoska, 'Labor in the Malay peninsula', pp. 243-44; Setsuho, 'Mining industry', p. 151; Sato, *War, nationalism*, pp. 168, 178.

³⁸ National Archives, Kew, T236/108, 'Report on Japanese financial manipulations' by Lt. Col. Sweeny; WO203/419 'Notes on the Southern Regions Development Bank', p. 24; Longmuir, *Money trail*, pp. 42-43, 100; Swan, 'Thai-Japan relations', pp. 317-20; Kratoska, 'Banana money'; Kikoyo, 'Japanese military policy', pp. 336-37.

numerous price controls, these tended to be ineffective. The Japanese themselves had largely to buy in the market, mainly through Chinese brokers and dealers.³⁹

Between 1942 and 1945, inflation and money supply relationships in Thailand and southern Indochina (Cochinchina and the lower part of Annam, together represented by Saigon) appear to satisfy even the naïve quantity theory. The price level in Thailand at the end of occupation, at 7.1 times December 1941 prices, compares to a 6.9-fold increase in money. It could be that inflation data somewhat understate actual price rises.⁴⁰ However, in both countries measures to decrease money supply helped to limit inflation. Thailand's demonetization of the 1,000 baht note reduced the money supply by some 30%, while in March 1945 Indochina limited withdrawals from banks for individual depositors to 2,000 piastres per month.⁴¹ A separate price index exists for Hanoi (northern Indochina) but not separate money supply figures. The Hanoi index indicates a 15-fold increase in wartime prices and this is supported by other price data.⁴² A main focus of the present paper is the holding of real balances in rice-surplus areas. Since northern Indochina around Hanoi was a rice deficit area and one without its own money supply data, the remainder of the paper concentrates on southern Indochina.

Among the military-administered countries, Burma was comparable to Thailand and Indochina. Data for Burma are for Rangoon, and so, like Thailand and southern Indochina, indicative of the demand for money in a rice-surplus area. Unlike Thailand and Indochina, however, Burma was subject to instability associated with political uncertainty and some of the most intense fighting in the Southeast Asian theatre. A lack of data for 1942 and 1943 hampers analysis, but from Japan's initial bombing of Rangoon on Christmas Day 1941, through the city's fall on 8 March 1942 and possibly until March 1943, prices appear to have

³⁹ Agoncillo, *Fateful years*, pp. 537-38, 572.

⁴⁰ Ungphakorn and Suvarnsit, 'Fiscal and other measures', p. 70.

⁴¹ Thailand, *Report 1941-1950*, p. 53; AOM Conseiller Politique 226: Memoires d'Yokoyoma, section 7.

⁴² National Archives, Kew, T236/108, telegram from SACSEA to War Office, 1 Sept. 1945.

risen much faster than money supply. Stability followed and during the next 21 months, until December 1944, although money supply increased by about a factor of 10, prices rose only slightly faster. However, between January and August 1945, which included Rangoon's fall in May, while Burma's money supply less than doubled prices rose by 21.4 times. Largely as a result, during the war as a whole Burmese prices increased by a factor of 1,856.5.

In Malaya, the Philippines and Indonesia, price rises far outdistance monetary expansion. Malaya appears the extreme example: money supply was 25.1 times greater by the end of war but prices over 11,000 times higher. However, the Philippines and Indonesia might well have similar money supply and price histories if data were available for the final weeks of the war when the Japanese issued especially great quantities of currency.

The literature almost universally refers to hyperinflation in Southeast Asia. But on the Cagan definition of price rises of at least 50% a month or the Reinhart-Rogoff criteria of a 40% monthly increase, hyperinflation was not typical of wartime Southeast Asia and where it occurred was a late phenomenon.⁴³ Except for the last months of the war, only the Philippines had a 40% or more monthly price rise. Even there, inflation did not reach 40% until August 1943 and failed to stay above that level for consecutive months until the final five months of occupation. Between November 1943 and January 1945, monthly Philippine inflation exceeded 50% on three occasions, but each time fell below this level in the next month. Inflation in Malaya, although in 1945 often at monthly levels in the high twenties, never approached 40% monthly inflation until the final days of the war in August. Burma became hyperinflationary in the last two months of the war as retreating Japanese troops desperately drew on their monetary stocks to obtain food and supplies.

REAL BALANCES

⁴³ Cagan, 'Monetary dynamics', p. 25; Rogoff and Reinhart, *This time*, p. 5. European hyperinflations, as described by Sargent ('Ends'), were all far more extreme than price rises in wartime Southeast Asia.

This section explores contrasting trends in real balances. In Thailand, Indochina (figures 2 and 3), and before 1945 in Burma, real balances, despite high inflation, were well maintained. By contrast, in the military-administered countries of Malaya and the Philippines real balances fell sharply during occupation (figures 4 and 5). But even in these countries, the holding of real balances remained sufficient to largely avoid hyperinflation and enable Japan to finance occupation chiefly by printing money. The section considers motives for holding money and poses the question: why did Southeast Asians continue to hold money to the extent they did when its value was being comprehensively debauched?

Malaya, the Philippines and Indonesia

During high inflation or hyperinflation, an inverse relationship, posited by the model (figure 1) and strongly borne out by Malayan and Philippine experience, characteristically exists between real balances and rising prices: people demand less money as its real value falls and the cost of holding currency rises (figures 4 and 5). Usually, in high- or hyper-inflation economies, real balances at first rise because, as Keynes observed, people are so accustomed to considering money the ultimate standard that they hoard it and postpone purchases.⁴⁴ And even after real balances start to fall, decline is often erratic and marked by reversals.⁴⁵

Although decline was not continuous in Malaya and the Philippines, in neither country was there sufficient willingness to hold scrip — the banana and Mickey Mouse money — to support more than brief rises in real balances. Nor was confidence in scrip helped by Allied propaganda which repeatedly stressed that scrip would become worthless after Japan surrendered — a tactic that Japanese analysts partly blamed for the falling value of scrip.⁴⁶ By August 1945 in Malaya, real balances stood at 2.0% of their level at the onset

⁴⁴ Keynes, *Tract*, p. 40.

⁴⁵ Cagan, 'Monetary dynamics', p. 27. See also the example of initial increases in money stock in the Soviet hyperinflation in Bernholz, 'Currency substitution', p. 301.

⁴⁶ Japan, Southern Area Military Administration, *Sōchō Shi No. 23 (Withdrawal of Money)* p. 4.

of occupation, while in January 1945 in the Philippines the figure was 3.2%. In July 1945, Indonesian real balances were a third of their initial level.

Three main reasons explain why scrip was held in military-administered Southeast Asia. One is military decree strongly backed up by coercion. After the first year of occupation Japanese administrations outlawed the use of pre-war currencies. Their mere possession was deemed criminal and punishable with arrest, often torture, or even death.⁴⁷

Second, good money substitutes for scrip were not available. Japan implemented autarky in individual Southeast Asian countries, since otherwise the military loss of one area might lead to the loss of other areas. Autarky supported Japanese monetary monopoly by largely cutting off access to substitute currencies. Available substitutes were mainly a clandestine use of pre-war monies and various guerrilla-issued currencies in the Philippines.

A third, and important, reason to hold scrip was its considerable transactional benefits. The Japanese administered Southeast Asia's military-run economies, and as far as possible also the economies of Thailand and Indochina, through monopoly buying and distributing organizations. These organizations became effectively the only market for pre-war export staples like rubber and tin in Malaya and sugar and abaca in the Philippines. Not only had pre-war export markets disappeared, but little or no local (barter) demand for the staples existed since none were basic foodstuffs. Malayan and Philippine staple producers, central to the economies of the two countries, relied on obtaining wage goods through selling to Japanese buyers who paid in scrip. Likewise, labourers and others employed by the Japanese who were paid wages got these in scrip. Furthermore, nearly everyone in the military-administered countries needed scrip for the many taxes levied by the Japanese, to

⁴⁷ Japan, Southern Area Military Administration, *Sōchō Shi No. 23 (Withdrawal of Money)*, p. 17; National Archives, Kew, CO852/510/24 C. D. Adhearne, 'The Malayan currency problem no. 2', p. 1; WO203/390 telegram BMA to SACSEA November 1945; United States National Archives and Records Administration, 226 16 208, 'Economic conditions in the Philippines' 13 October 1942, p. 7; Chin, *Malaya*, pp. 123-24.

obtain rationed goods which became a main source of food and clothing, and to purchase lottery tickets, pay at amusement parks and so forth.

Scrip was, however, largely, and increasingly, shunned as a store of value. In Malaya, ‘only the most stupid were lulled into a sense of wealth’ by holding large quantities of Japanese notes. Others ‘who had amassed “fortunes” quickly changed the paper money into commodities, and substantial investments’.⁴⁸ Apparently, given the opportunity even the clerks in Japanese banks changed their pocket money into British currency.⁴⁹ Whatever store of value function scrip had, Axis reversals eroded it: in Malaya, ‘Every time there was an Axis defeat, particularly Japanese defeats, prices of goods jumped up. Every Allied victory ... and every visit of B-29s over Malaya, caused spurts of prices in foodstuffs. Saipan, Iwojima, Manila, Rangoon, and Okinawa were inflation spring-boards’.⁵⁰ In the Philippines, prices rose each time air-raid precautions and defence drills were held in Manila.⁵¹ Insofar as money, as opposed to jewels or durable goods, remained a store of value, this largely devolved to pre-war currencies exchanged among those considered trustworthy.⁵²

Thailand, Indochina and Burma

In Thailand and Indochina, the record of maintaining real money balances is impressive (figures 2 and 3). The same appears to be true of Burma for much of the period that encompassed the establishment of a Japanese regime, the nominally independent Ba Maw government formed in August 1943, and until the country’s 1945 descent into military chaos. The maintenance of real balances is especially striking, since models like that in figure 1 specify a negative relationship between money demand and inflation and implicitly assume constant real income. Falls in GDP, as in wartime Southeast Asia, would shift the demand for real balances leftwards and point to the likelihood of hyperinflation.

⁴⁸ Chin, *Malaya upside down*, p. 45.

⁴⁹ Japan, Southern Area Military Administration, *Sōchō Shi No. 23 (Withdrawal of Money)*, p. 6.

⁵⁰ Chin, *Malaya upside down*, p. 45.

⁵¹ Jose, ‘Rice shortages’, p. 211.

⁵² See, for example, Akbar, *Aishabee at war*, p. 134.

Real balances in Thailand stayed approximately constant and in Indochina appear to have risen. In Burma, after an apparently sharp fall, real balances stabilized and remained near to or above their March 1943 level until December 1944. During 1945, however, decline was continuous and rapid after the British launched two major offensives followed by the capture of Mandalay on 20 March the fall of Rangoon on 3 May. In August 1945, real balances in Burma were 9% of those in June 1942.

In Thailand, Indochina and Burma, the transactional motives for holding money were similar to Malaya and the Philippines. Burmese economic life, for example, was ‘largely (if not entirely) based on Japanese-issued rupees’⁵³ These were, a wartime Burmese government official recalled, the only legal currency and an unwillingness to accept them ‘meant imprisonment, torture or death’.⁵⁴ The Thai and Indochinese governments helped to sustain a demand for money through policies to support producers by buying their output.⁵⁵

The unchanged wartime look of the Thai baht and Indochina piastre probably encouraged confidence in these currencies. By seeming to assure money’s store of value properties, this may have contributed to the maintenance of real balances. But the principal explanation lies elsewhere. High real balances in Thailand, Indochina and, for at least part of the war, in Burma are explained mainly by the composition of production in these three economies, their production structures, and the near absence even of simple consumer goods to buy during much of the conflict. All three economies were overwhelmingly rural and highly specialized in rice production. Rice, in turn, was grown by numerous small peasant growers. Unlike producers in the rice deficit areas, they could easily achieve food self-sufficiency since rice was in over-supply and many other basic foodstuffs could be obtained through household production or barter.

⁵³ Bank of England OV79/16 ‘Burma – reoccupation, 27 April 1944’. And see *The Times* ‘A false step in Burma’ 22 May 1945 which made the same point.

⁵⁴ Pe, *Narrative of the Japanese occupation*, p. 93.

⁵⁵ United States, Office of Strategic Services, *Indochina’s wartime government*, pp. 33-34; United States, Office of Strategic Services, *Status of the Chinese*, p. 26; United States, Office of Strategic Services, *Rubber industry*, p. 7.

Small rural cultivators like those dominating rice production in Thailand, Indochina and Burma tend to hoard money, even in the face of inflation. Under inflationary conditions, Keynes observed, as ‘more money flows into the pockets of the peasants, it tends to stick there’.⁵⁶ For Thailand, it was explained that only 20% or 25% of notes in circulation were in Bangkok; ‘The rest are in the provinces where they disappear into farmers’ hoards: and the demand of the provinces for fresh supplies of notes is a never ceasing one’.⁵⁷ In Burma, during the war’s latter stages, villagers in the rice-producing districts still insisted on payment in Japanese currency: ‘They thought it was better than British and enjoyed the feeling of wealth which they got by carrying away large wads of brand new Jap notes’.⁵⁸ Even when brought to the cities, rural dwellers like Indochina’s Cao Đài religious sect apparently had consumption patterns little affected by inflation. In Saigon, the Japanese relied heavily on the Cao Đài for their workforce who, being vegetarians ‘ate simple food with lots of vegetables, rice, and seeds. Any extra money they earned went back to their families or to their temples’.⁵⁹

Peasant money illusion may not, however, fully account for the holding of money in rice-surplus areas. Producers in these areas had limited spending opportunities. None of the rice-producing economies were close to self-sufficiency even in basic consumer items, and since Japan sent few goods to Southeast Asia there was little to buy in rural areas.⁶⁰ Given this absence of goods, and if Southeast Asians anticipated a post-war redemption of wartime notes, it was rational to hold money in the expectation of its commanding more goods after the war. The wartime price of unavailable goods was infinite. But when war scarcities ended

⁵⁶ Keynes, *Tract*, p. 66.

⁵⁷ Thailand, *Report 1941-1950*, p. 55. The same hoarding behavior was repeated in Thailand’s 1949-1951 inflation. Despite a large increase in money supply, prices did not rise to any comparable extent. Apparently, ‘a large volume of notes were simply hoarded, mainly by up-country producers’. Wiwat, *Wiwatthanachaiyanuson*, p. 268.

⁵⁸ IOR M4/306, A. K. Potter, ‘Currency policy, Burma’, 31 May 1945.

⁵⁹ Trần, ‘Working for the Japanese’, p. 291.

⁶⁰ Robequain, *Economic development*, pp. 381, 383; Ingram *Economic change*, p. 164; Thamsook, *Thailand and the Japanese presence*, pp. 88-92; Le, *Impact on Vietnam*, p. 188; Jose, ‘Labor usage and mobilization’, p. 270; Pe, *Narrative*, p. 55.

prices would decline dramatically. Note redemption looked almost certain in Thailand and Indochina where pre-war monetary authorities continued to issue currency. Until 1945, redemption may also have seemed likely in Burma in light of the establishment of the Ba Maw government followed by its 1944 issue of a specimen Burmese currency.

SEIGNIORAGE AND THE INFLATION TAX

Governments and military administrations, Keynes remarked, rely on seigniorage to finance themselves when no other methods exist.⁶¹ While that was not strictly true in Southeast Asia, for much of the war the issue of currency and resultant seigniorage was an effective, as well a near costless, way for Japan to tax the mass of the population and finance occupation. That seigniorage should have this role is not unusual: during the World War II Greek hyperinflation, with price rises much greater than anywhere in Southeast Asia, monthly seigniorage often exceeded German occupation costs.⁶² This section quantifies seigniorage and decomposes it into revenue from changes in real money balances and the inflation tax.

Components of seigniorage

Seigniorage can be written as:

$$\frac{dH}{P} = \frac{H_t - H_{t-1}}{P_t} = \frac{H_t}{P_t} - \frac{H_{t-1}}{P_t} \quad (3)$$

where, as before, H is money and P the price level. Letting Π stand for inflation, and both adding and subtracting the lagged real base to and from the right side of equation (3) yields:

$$\begin{aligned} \frac{H_t - H_{t-1}}{P_t} &= \frac{H_t}{P_t} - \frac{H_{t-1}}{P_{t-1}} + \frac{H_{t-1}}{P_{t-1}} - \frac{H_{t-1}}{P_{t-1}(1 + \Pi_t)} \\ \therefore \frac{H_t - H_{t-1}}{P_t} &= \left[\frac{H_t}{P_t} - \frac{H_{t-1}}{P_{t-1}} \right] + \left[\frac{\Pi_t}{1 + \Pi_t} \right] \left(\frac{H_{t-1}}{P_{t-1}} \right) \end{aligned} \quad (4)$$

Real seigniorage is therefore made up of two elements. The first (in square brackets) is the change in real money balances from one period to the next. Normally, this accounts for

⁶¹ Keynes, *Tract*, p. 37.

⁶² Palairt, *Four ends*, pp. 142-47.

about half of seigniorage and can be its main component in an economy experiencing high real GDP. The second (product of brackets) term represents the inflation tax. It is the tax levied on the real base and the amount by which the private sector must augment its nominal money holdings to maintain the same value of the real balances when inflation is positive.

Japanese finance in wartime Southeast Asia relied chiefly and increasingly on this inflation tax (table 6). Nevertheless, important differences are apparent between rice-surplus Thailand, Indochina and Burma, where real balances were generally maintained, and Malaya, the Philippines, Indonesia and Burma, after 1944, where they were not. In Thailand and Indochina, high real balances, despite high inflation and falling GDP, allowed increasing amounts of seigniorage to be realized at relatively low tax rates. Between 1942 and 1944, seigniorage in Thailand doubled while the inflation tax (although still near 100%) fell somewhat. In 1945, however, the contribution of real balances became negative as Thais sought to avoid the tax on inflation.

To try to preserve seigniorage, Japanese military administrators had to rely on high inflation taxes to try to offset strongly negative changes in real balances. In the Philippines, the inflation tax reached 651% in 1943 and 778.1% in 1944. That did not, however, prevent a sharp fall in seigniorage as populations sought to avoid taxation.

Seigniorage and inflation instability

The model in figure 1 predicts that with the money demand function shifting left (for the reasons mentioned earlier), and on approaching $A = B$ on any given hyperbola, Southeast Asian economies would be entering an unstable inflation regime. For the most part, even Southeast Asia's military-administered countries seem not to have moved beyond this unstable $A = B$ tangency until late in the war.

In the model if the inflation instability occurs and if a fall in seigniorage is sufficient to restore some semblance of stability (back shift of the hyperbola), equilibrium on the new hyperbola would likely be of variety 'A' rather than 'B'. This suggests that inflation instability

would tend to rise at the same time that the level of real seigniorage was tending to decline. The Philippines, the only Southeast Asian country with sufficient data available, provides evidence to assess this prediction.

In the Philippines, just at the mid-1943 reversal of Japanese war strategy, when the military needed more funding for defence installations, the pattern of seigniorage changed. It both turned decisively downwards and became unstable. To show this, we divide the sample at August 1943 and for the 18 observations on each side of this wartime break and regress seigniorage on a time trend. Figure 6 plots the fitted values and residuals for the two regressions. The standard deviation of the regression residuals is 4.96 for January 1942 to July 1943 but 9.97 for August 1943 to January 1945. A similar conclusion, that in the latter part of the war the Philippines was near a point like B in figure 1, is also indicated by the timing of the instances when Philippines prices briefly exceeded the Cagan definition of hyperinflation. All three were between August 1943 and the fall of Manila in February 1945.

CONCLUDING REMARKS

Japanese expectations for the gains from war in Southeast Asia — the realization of a Greater East Asia Co-Prosperity Sphere — went well beyond the immediate policy to exploit Southeast Asia through financial arrangements and had as a basis the economics of large areas. East Asia would be moulded into a vast autarkic economic unit centred on Japan and supplying resources to it. While wartime financial policy was only a part of this plan for a new economic order, it revealed, perhaps as much as anything, the reality of Japan's vision of shared prosperity in Greater East Asia.

Even in the short term, however, net Japanese gains from war in Southeast Asia were not large. After 1942, rice imports fell sharply and in 1944 and 1945 were negligible. Rice apart, oil and bauxite were the main strategic materials obtained from Southeast Asia, again mainly in the first year of the war. Between 1942 and 1945, Japanese military expenditure divided between 41.9% at home and 58.1% in Southeast Asia, China, Manchuria, Korea and

Taiwan. Southeast Asia accounted for somewhat over a quarter of this overseas spending and 16.4% of all expenditure.⁶³ Finance for the bulk of spending overseas came, as with Southeast Asia, from these areas themselves.⁶⁴ Existing data preclude a balancing figure for spending in Japan for the war in Southeast Asia to set against the spending imposed on Southeast Asians. Probably, however, expenditure in Japan was at least as much as in Southeast Asia. Although the Japanese Navy spent less in total than the Army, it spent significantly more at home and since naval forces operated chiefly in the Pacific rather than China much of this spending would have related to Southeast Asia.

After deciding on war to pursue empire, Japan had little alternative to inflation as the main way to finance occupation in Southeast Asia, and almost certainly also saw its advantages. Although in the longer term high inflation might well re-order Southeast Asian societies, this was not inconsistent with the aim of replacing the pre-war order with Japanese empire. At the same time, inflation offered an efficient means of wartime finance. It avoided the enforcement problems of overt taxation in a big geographical area with a predominantly rural population and over which Japanese officials, forced to take over the entire administration of four countries, were thinly spread. Tax collection was further complicated since few Southeast Asians spoke Japanese or, as occupation continued, remained sympathetic to Japan.

Key financial aspects of an extension to Southeast Asia of a managed, Japan-centred East Asian economy were administratively set exchange rates, Southeast Asian 'central banks' to issue currency as required by Japan, and a yen bloc of bilateral trading arrangements, like those with Thailand and Indochina. Together these would have done much to alleviate Japan's pre-war foreign exchange shortage by eliminating any mechanism that forced Japan to reduce her international debts in Southeast Asia. Pursuit of that goal

⁶³ Japan, Ministry of Finance, *Showa Finance*, p. 222.

⁶⁴ United States Strategic Bombing Survey, *Effects of strategic bombing*, p. 91.

explains why Japanese planners had intended in military-administered Southeast Asia to replace scrip with national currencies and institute monetary systems like those with Thailand and Indochina. In 1944, the State Bank of Burma was set up as a ‘central bank’, but plans for a yen-linked Burmese currency got underway too late to go beyond the currency’s specimen issue.⁶⁵

It is striking that even military-administered Southeast Asia had comparatively moderate, Latin American-like inflation for much of the war and hyperinflation only near its end when Japan had clearly lost. In light of the model explored in this paper, Southeast Asia’s wartime inflation experience is testament to a combination of strict Japanese controls and the transactions benefits of holding money despite its rapidly depreciating real value. Stanley Fischer advocates requirements to use domestic rather than a foreign currency as a way for governments to capture seigniorage.⁶⁶ Rigorous Japanese enforcement of government monetary monopoly backed up by strong sanctions against anyone who did not use scrip was an extreme application of Fischer’s idea.

In Southeast Asia, a continuing demand for real balances enabled Japan to avoid issuing as much new money as would have been required if the demand for real balances had been less and therefore the rise in prices greater. Scrip, occupation costs, clearing arrangements and seigniorage afforded Japan a low-cost way to finance occupation and gain control of Southeast Asian resources. In the end, however, major Japanese failures in naval strategy, planning and the protection of merchant shipping prevented the full exploitative potential of the financial measures analyzed in this paper from being realized.

REFERENCES

Agoncillo, Teodoro A. *The fateful years: Japan’s adventure in the Philippines, 1941-45*, two vols. (Quezon City: R. P. Garcia Publishing Company, 1965).

⁶⁵ Longmuir, *Money trail*, pp. 44-47; United States, Office of Strategic Services, *Japanese financial programs*, p. 181; Shibata, *Senryōchi Tsūka*, p. 554.

⁶⁶ Fischer, ‘Seigniorage’, p. 306.

- Allen, Louis, 'Burma: the longest war, 1941-45' in Ian Nish and Mark Allen, eds., *War, conflict and security in Japan and Asia-Pacific, 1941-1952: the writings of Louis Allen* (Folkestone, Kent: Global Oriental, 2011), pp. 297-305.
- Bank of Japan Research Bureau, *Monetary history of Japan*, vol. 30 (Tokyo: Finance Ministry Printing Bureau, 1970).
- Bank of Japan Research Bureau, *Nihon Kin'yū Shi Shiryō (Resources on the History of Finance in Japan)* (Tokyo: Ministry of Finance Publishing Office, 1971).
- Banyai, Richard A., *Money and banking in China and Southeast Asia during the Japanese military occupation* (Taipei, 1974).
- Bassino, Jean-Pascal, *Asian Historical Statistics: Vietnam* (Tokyo: Toyo Keizai, forthcoming).
- Bastin, John and Harry J. Benda, *A history of modern Southeast Asia* (Englewood Cliffs, NJ: Prentice Hall, 1968).
- Benda, Harry J., James K. Irikura and Koichi Kishi, eds. *Japanese military administration in Indonesia: selected documents* (New Haven: Yale Southeast Asia Studies, 1965).
- Bernholz, Peter, 'Currency substitution during hyperinflation in the Soviet Union 1922-1924', *Journal of European Economic History* 25, 2 (1996), pp. 297-323.
- Bloc, Henry Simon and Bert F. Hoselitz, *Economics of military occupation: selected problems*, revised edn. (Chicago: University of Chicago Press, 1944).
- Bordo, Michael D. and Lars Jonung, *The long-run behaviour of the velocity of circulation* (Cambridge: Cambridge University Press, 1987).
- Bruno, Michael, *High inflation and the nominal anchors of an open economy*, National Bureau of Economics Working Paper no. 3518 (Cambridge: NBER, 1990).
- Burma Intelligence Bureau, *Burma during the Japanese Occupation*, vol. 2 (Simla: Government of India Press, 1944).
- Cagan, Philip, 'The monetary dynamics of hyperinflation' in Milton Friedman, ed., *Studies in the quantity theory of money* (Chicago: University of Chicago Press, 1956), pp. 25-117.
- Chin Kee Onn, *Malaya upside down* (Singapore: Jitts & Co., 1946).
- Cohen, Jerome B., *Japan's economy in war and reconstruction* (Minneapolis: University of Minnesota Press, 1949).
- Decoux, Admiral, *A la barre de l'Indochine: histoire de mon gouvernement général (1940-1945)* (Paris: Plon, 1949).
- Emery, Robert F., *The financial institutions of Southeast Asia* (New York: Praeger, 1970).
- Feeny, David, *The political economy of productivity: Thai agricultural development 1880-1975* (Vancouver: University of British Columbia Press, 1982).
- Fischer, Stanley, 'Seigniorage and the case for a national money', *Journal of Political Economy* 90, 2 (1982), pp. 295-313.
- Hata Ikuhiko, 'Continental expansion, 1905-1941' in Peter Duus, ed. *The Cambridge history of Japan, volume 6: The twentieth century* (Cambridge: Cambridge University Press, 1989), pp. 271-314.
- Hikita, Yasuyuki, *Nampō Kyōeiken: Senji Nihon no Tōnan Ajia Keizai Shihai (Southern Co-prosperity Sphere: Japanese economic control in South East Asia during the war)* (Tokyo: Taiga Shuppan, 1995).
- Ike, Nobutaka, ed. and translator, *Japan's decision for war: records of the 1941 policy conferences* (Stanford: Stanford University Press, 1967).
- Ingram, James C., *Economic change in Thailand 1850-1970* (Stanford: Stanford University Press, 1971).
- Indochina, *Annuaire statistique de l'Indochine*, irregular series covering the years 1913-1946 and published 1927-1948 (Hanoi).
- Iwatake, Teruhiko, *Nampō Gunseika no Keizai Seisaku (Economic policy of the Japanese*

- military government in South East Asia*), Reprint (Tokyo: Ryukei Shosha, 1991).
- Japan, Imperial Headquarters, Nampo Senryōchi Gyōsei Jisshi Yōkō, presented at the Liaison Conference, 20 November 1941, in Kishi Collection B1-224.
- Japan, *Annual return of the foreign trade of Japan*, annual series, 1941-1944-48 (Tokyo: Cabinet Printing Office, Ministry of Finance, or Ministry of Printing, 1941-1951).
- Japan, Southern Area Military Administration *Sōkambu* Research Group, *Sōchō Shi Article No. 6: Problems of inflation in East Coast residency, Sumatra* (Singapore, June 1943), Reprint, vol. 8, pp. 157-322.
- Japan, Southern Area Military Administration *Sōkambu* Research Group, *Sōchō Shi Article No. 15. Problems of currency and money in Malaya* (Singapore, Oct. 1943), Reprint, vol. 11, pp. 51-98.
- Japan, Southern Area Military Administration *Sōkambu* Research Group, *Sōchō Shi Article No. 23. Withdrawal of local money from circulation* (by Higuchi Gorō) (Singapore, Dec. 1943), Reprint, vol. 12, pp. 225-252.
- Japan, Ministry of Finance, Showa Finance History Compilation Office, *Showa Zaisei Shi IV: Rinji Gunji Hi (Showa finance history IV: extraordinary military expense)* (Tokyo: Toyo Keizai Shinpo Sha, 1955).
- Jose, Ricardo T., 'The rice shortage and countermeasures during the Japanese Occupation' in Ikehata Setsuho and Ricardo Trota Jose, eds., *The Philippines under Japanese Occupation* (Manila: Manila University Press, 1999), pp. 197-214.
- Keynes, J. M., *A tract on monetary reform* in *The collected writings of John Maynard Keynes*, vol. 4 (London: Macmillan for the Royal Economic Society, 1971).
- King, Frank H. H., *Money in British East Asia* (London: HMSO, 1957).
- Kiyoko Kurusu Nitz, 'Japanese military policy towards French Indochina during the Second World War: the road to the *meigo sakusen*' (9 March 1945)', *Journal of Southeast Asian Studies*, 14, 2 (1983), pp. 328-50.
- Kratoska, Paul H., 'Banana money: consequences of the demonetization of wartime Japanese currency in British Malaya', *Journal of Southeast Asian Studies* 23, 1 (1992), pp. 322-45.
- Kratoska, Paul H., *The Japanese Occupation of Malaya* (London: Hurst & Company, 1998).
- Kratoska, Paul H., 'Labor in the Malay peninsula and Singapore under Japanese occupation' in Paul H. Kratoska, ed., *Asian labor in the wartime Japanese empire* (Armonk, NY: M. E. Sharpe, 2005), pp. 237-48.
- Kurasawa, Aiko, 'Transportation and rice distribution in Southeast Asia during the Second World War' in Paul H. Kratoska, ed. *Food supplies and the Japanese Occupation* (Houndmills: Macmillan, 1998), pp. 32-66.
- Le Manh Hung, *The impact of World War II on the economy of Vietnam 1939-45* (Singapore: Eastern Universities Press, 2004).
- Maddison, Angus, *The world economy: historical statistics* (Paris: OECD, 2003).
- Milward, Alan S., *The new order and the French economy* (Oxford: Clarendon Press, 1970).
- Milward, Alan S., *The fascist economy in Norway* (Oxford: Clarendon Press, 1972).
- Milward, Alan S., *War, economy and society, 1939-1945* (London: Allen Lane, 1977).
- Nakamura Takafusa, 'The yen bloc, 1931-1941' in Peter Duus, Raymond H. Myers and Mark Peattie, eds., *The Japanese wartime empire, 1931-1945* (Princeton: Princeton University Press, 1996), pp. 171-86.
- Nazrin, Raja, *Essays on economic growth in Malaysia in the twentieth century*. Unpublished Ph.D thesis, Harvard University, 2000.
- Neal, Larry, 'Introduction' in Larry Neal, ed. *War finance*, vol. 1 (Aldershot, Hants: Edward Elgar, 1994), pp. ix-xxxvi.
- Occhino, Filippo, Kim Oosterlinck and Eugene N. White, 'How occupied France financed its own exploitation during World War II', *American Economic Review* 97, 2 (2007), pp.

295-99.

- Occhino, Filippo, Kim Oosterlinck and Eugene N. White, 'How much can a victor force the vanquished to pay? France under the Nazi boot', *Journal of Economic History* 68, 1 (2008), pp. 1-45.
- Palairat, Michael, *The four ends of the Greek hyperinflation of 1941-1946* (Copenhagen: Museum Tusulanum Press, 2000).
- Ránki, György, *The economics of the Second World War* (Wein: Bohlau Verlag, 1993).
- Reinhart, Carmen M. and Kenneth S. Rogoff, *This time is different: eight centuries of financial folly* (Princeton: Princeton University Press, 2009).
- Robequain, Charles, *The economic development of French Indo-China* (London: Oxford University Press, 1944).
- Romualdez, Eduardo Z., 'Financial problems created by the war', *Journal of the Philippine National Historical Society*, 10, 4 (1962), pp. 448-518.
- Sato, Shigeru, *War, nationalism and peasants: Java under the Japanese Occupation 1942-1945* (Armonk, NY: M. E. Sharpe, 1994).
- Sargent, Thomas J., 'The ends of four big inflations' in Robert E. Hall, ed. *Inflation: causes and effects* (Chicago: University of Chicago Press, 1982), pp. 41-97.
- Setshuo, Ikehata, 'Mining industry development and local anti-Japanese resistance' in Ikehata Setsuho and Ricardo Trota Jose, eds., *The Philippines under Japanese Occupation* (Manila: Manila University Press, 1999), pp. 197-61.
- Shibata Yoshimasa, 'The monetary policy in the Netherlands East Indies under the Japanese administration', *Bijdragen Tot de Taal-, Land-en Volkenkunde* 152, 4 (1996), pp. 699-724.
- Shibata, Yoshimasa, *Senryōchi Tsūka Kinnyū Seisaku no Tenkai (Japan's monetary policy in the occupied territories)* (Tokyo: Nihon Keizai Shinbun Sha, 1999).
- Shimazaki, Kyuya, *En no Shinryaku Shi: En Kawase Hon'i Seido no Keisei Katei (The invasion of yen: the making of the yen exchange standard system)* (Tokyo: Nihon Keizai Shimbun Sha, 1989).
- Sompop Manarungsan, *Economic development of Thailand, 1850-1950: response to the challenge of the world economy* (Groningen: University of Groningen, 1989).
- Sugimoto, Ichiro, *Economic growth of Singapore in the twentieth century*. Unpublished Ph.D thesis, University of Malaya, Kuala Lumpur, 2008.
- Swan, William L., 'Thai-Japan monetary relations at the start of the Pacific war', *Modern Asian Studies*, 23, 2 (1989), pp. 313-47.
- Tabuchi, Yukichika, 'Indochina's role in Japan's Greater East Asian Co-Prosperity Sphere: a food procurement strategy' in Takashi Shiraishi and Motoo Furuta, eds., *Indochina in the 1940s and 1950s* (Ithaca: Cornell Southeast Asia Program, 1992), pp. 87-112.
- Thailand, Department of Commerce and Statistics, *Statistical year book of Thailand*, annual series, 1939-40 to 1944 (Bangkok: Central Service of Statistics, 1944).
- Thailand, *Report of the financial adviser covering the years 1941 to 1950* (Bangkok, 1951).
- Thamsook Numnonda, *Thailand and the Japanese presence, 1941-1945* (Singapore: Institute of Southeast Asian Studies, 1977).
- Tran, My-Van, 'Working for the Japanese: working for Vietnamese independence, 1941-45' in Paul H. Kratoska, ed., *Asian labor in the wartime Japanese empire* (Armonk, NY: M. E. Sharpe, 2005), pp. 287-99.
- Ungphakorn, Puey and Renoo Suvarnsit, 'Fiscal and other measures for combating inflation in Thailand' in United Nations, Economic Commission for Asia and the Far East, *Mobilization of domestic capital: report and documents of the first working party of experts* (Bangkok: Department of Economic Affairs, ECAFE, 1952), pp. 70-74.
- United States, Office of Strategic Services, Research and Analysis Branch, *Political and economic changes effected by the Japanese in Malaya* (Washington, December 1943).

- United States, Office of Strategic Services, Research and Analysis Branch, *Japanese administration in Malaya* (Washington, 8 June 1944).
- United States, Office of Strategic Services, Research and Analysis Branch, *Japanese financial programs*, vol. 2, part 3: Southeast Asia (Washington, 20 September 1944).
- United States, Office of Strategic Services, Research and Analysis Branch, *The rubber industry of Southeast Asia: an estimate of present conditions and anticipated capabilities* (Washington, 16 December 1944).
- United States, Office of Strategic Services, Research and Analysis Branch, *Indochina's wartime government and main aspects of French rule* (Washington, 10 July 1945).
- United States, Office of Strategic Services, Research and Analysis Branch, *The status of the Chinese in Thailand* (Washington, 13 March 1945).
- United States, Office of Strategic Services, Research and Analysis Branch, *Control of inflation in Japan* (Washington, 1 October 1945).
- United States, Office of Strategic Services, Research and Analysis Branch, *Financial relations between Siam and Japan, 1940-45* (Washington, 1 July 1947).
- United States Strategic Bombing Survey, *The effects of strategic bombing on Japan's war economy* (Washington, US Government Printing Office, 1946).
- Wiwat, Prince, *Wiwatthanachaiyanuson* (Prince Wiwat memorial volume) (Bangkok, 1961).
- van der Eng, Pierre, *Indonesian national income* (processed, 1991).
- van der Eng, Pierre, *Estimates of GDP per capita in Malaya, 1910-1965 (excluding Singapore)*, (processed, 1992).
- van der Eng, Pierre, Estimates of GDP based on Sompop, processed.
- van der Eng, Pierre, 'The real domestic product of Indonesia, 1880-1989', *Explorations in Economic History*, 29, 3 (1992), pp. 343-73.
- van der Eng, Pierre, *The silver standard and Asia's integration into the world economy* (Canberra: Australian National University, Department of Economic History, working paper no.175, 1993).
- van der Eng, Pierre, *Thailand estimates of GDP based on Sompop's work* (processed, 1994).
- Van der Wee, Herman and Monique Verbreyt, *A small nation in the turmoil of the Second World War: money, finance and occupation (Belgium, its enemies, its friends, 1939-1945)* (Leuven: Leuven University Press, 2009).
- Vu Ngu Chieu, 'The other side of the 1945 Vietnamese revolution: the empire of Vietnam (March-August 1945)', *Journal of Asian Studies* 45, 2 (1986), pp. 293-328.
- Yoshio, Ando, ed., *Kindai Nihon Keizaisi Yoran* (Handbook of modern Japanese economic history), 2nd ed., (Tokyo: University of Tokyo Press, 1979).

APPENDIX

Burma: *Money supply:* Southern Development Bank, 'Monthly Balance of Southern Development Bank Notes' (Foreign Office Diplomacy Record, Navy-I-1-6); Bank of Japan, *Monetary history of Japan*, p. 384; Longmuir, *Money trail*, p.43. *Prices:* Prices are for Rangoon and from Bank of Japan, *Monetary history of Japan*, p. 385.

Malaya: *Money supply:* Southern Development Bank, 'Monthly Balance of Southern Development notes'; Bank of Japan, *Monetary history of Japan*, p. 384. *Prices:* Prices are for Singapore and up to December 1944 from a wholesale price index from the Bank of Japan, *Monetary history of Japan*, p. 385. December 1944 prices are linked to a cost of living index from 'Validity of contracts entered into before and during the Japanese occupation', National Archives, Kew CO853/726/3. The cost of living index was constructed by British authorities after the war using Japanese records of a large variety of retail prices and records from a number of government bodies. Weights are: foodstuffs 0.65; tobacco 0.04; light and water 0.04; transport 0.10; clothing 0.08 and rent 0.09. For May to 12 August 1945, this cost of living index is linked to an index of the value of the British-issued Straits dollar in terms of occupation currency. Throughout the occupation the cost of living and value of Straits dollar indexes moved closely together. However, the Bank of Japan wholesale price index records substantially higher inflation than the British reconstruction of a cost of living index.

Thailand: *Money supply and Yen credits:* Thailand, *Statistical yearbook, 1939-40 -1944*, p. 435; Thailand, *Report of the Financial Adviser 1941-1950*, p. 54. Payments to Japan are yen credits plus Thailand's trade surplus. The annual trade surplus and sale of gold by Japan are from Shenoy, 'Currency, banking and exchange', p. 291. In the official statistics the inclusion of yen credits as imports gives the misleading impression that Thailand ran a large trade deficit with Japan. See Thailand, *Report of the Financial Adviser, 1941-1950*, pp. 7-14. *Prices:* Ingram, *Economic change*, p. 164 derived from Bank of Thailand figures for the cost of living and based on the family budget of white-collar workers and wage earners in Bangkok. According to Ungphakorn and Suvarnsit ('Fiscal and other measures', p. 70) the inflation figures cited in Ingram are 'lower than most people would consider as representing the actual level of prices'. For an alternative, somewhat different but apparently less reliable, price index, see Thailand, *Report of the Financial Adviser 1941-1950*, p. 55. *Government revenue and expenditure:* Thailand, *Report of the Financial Adviser 1941-1950*, pp. 1-3.

Indonesia: *Money supply:* Southern Development Bank, 'Monthly Balance of Southern Development Notes'. The 1941 figure is from Shibata, 'Monetary policy', p. 702 which gives a figure of 316m guilders for 6 December 1941. Payments to Japan are the annual change in money supply. *Prices:* Bank of Japan, *Monetary history of Japan*, p. 385. Prices are for Jakarta and differ in some instances from prices for Medan reported in the same source.

Indochina: *Money supply, Yen credits and trade surplus:* Indochina, *Annuaire de statistique 1941-1942*, pp. 176, 245 and 1943-46, pp. 179-80, 287. Yen credits are expenditure by Japanese armed forces in Indochina and from Lt. Colonel T. H. Sweeny, 'Second report on Japanese financial manipulations in French Indo China', National Archives, Kew, FO371/53959. After a 9 March 1945 coup the Japanese took over Indochina. They printed large amounts of currency near the end of the war, but much of it appears not to have been put into circulation. *Prices:* Vietnam, *Annuaire statistique du Viêt Nam, 1949-1950*, p. 283. Price data are for the Saigon working class cost of living. For 1945 data are an average of the first two quarters. *Government revenue and expenditure:* Indochina, *Annuaire de statistique 1943-46*, pp. 257-60, 304. The budget deficit is quantified as 'VII. Recettes extraordinaires' on p. 260. A similar entry does not appear for 1942. See Indochina, *Annuaire de statistique 1941-1942*, p. 245.

Philippines: *Money supply:* Romualdez, 'Financial problems', pp. 450-52. Money supply data includes the 230m of pre-war treasury certificates. Before 1945 money supply data from Romualdez and the Southern Regions Development Bank, 'Monthly Balance of Southern Development Bank Notes' are in close agreement but for 1945 the Bank's data shows a smaller increase in money supply. *Prices:* Romualdez, 'Financial problems', pp. 461-62. Price data are unavailable after January 1945.

Note: In military-administered Southeast Asia, money supply data during the first year of the Japanese occupation exclude, except for the Philippines, pre-war currency issue. During this period, before the use of colonial currencies was prohibited data is subject of some uncertainty since it is unknown at what rate pre-war money disappeared from circulation.

GDP: *Notes:* For Burma, the Philippines and Japan all data are from Maddison. Figures for Malaya, Thailand, Indonesia and Vietnam benchmark per capita GDP in Maddison (1938 benchmark for Thailand and Indonesia; 1913 for Malaya and Indochina) and use per capita GDP data from van der Eng and Bassino, transformed into indexes, to extend Maddison's data. The indexes are multiplied by Maddison's benchmark 1990 GK\$. Results of this estimation procedure agree closely with 1950 figures from Maddison. Malaya includes the Malay peninsula (including Penang and Malacca) and Singapore. Account is taken of higher per capita income for Singapore than the peninsula as follows. For both 1913 and 1950, Maddison shows Singapore per capita income to be 42% higher than peninsular. Accordingly, Peninsular per capita income is multiplied by 1.42 to estimate Singapore's income. Malayan income to include Singapore is weighted by, for 1938-1940 Singapore's share of 12.9% of Malayan population recorded by the 1931 census and, for 1949 and 1950 the 16.1% share recorded by the 1947 census. Per capita income in Indochina is assumed to be the same as in Vietnam and estimated to include Cambodia and Laos by multiplying the 1936 share in total Indochina population of those two provinces by Vietnam GDP and adding the result to Vietnam GDP. In 1936, Vietnam contained 82.4% the pre-war Indochinese population. While GDP measures are the estimates of highly knowledgeable scholars of Thailand and Indochina respectively, they are nevertheless likely to incorporate a margin of error. Estimates may also underestimate GDP due to difficulties in taking into account black market transactions. *GDP Sources:* Maddison, *World economy: historical statistics*, pp. 180-85; van der Eng, *Historical estimates of GDP in Malaysia/West Malaysia*; van der Eng, *Thailand estimates of GDP based on Sompop*; van der Eng, 'Real domestic product of Indonesia', pp. 368-69; Jean-Pascal Bassino, personal communication, Vietnam national income, 6 Feb. 2011.

Exchange rates: van der Eng, *Silver standard*.

Table 1 Southeast Asia Payments to Japan, 1941-1945

<i>a) Thailand baht 000</i>				
	GDP current prices	Yen credits	Yen credits as a % of GDP at wartime exchange rates	Yen credits as a % of GDP at 1937 exchange rates
1942	2,531,956	61,000	2.4	3.8
1943	4,218,629	176,050	4.2	6.5
1944	7,119,363	520,840	7.3	11.4
1945	12,505,066	800,910	6.4	10.0
<i>b) Indochina piastres 000</i>				
	GDP current prices	Occupation costs and trade surplus	Occupation costs and trade surplus as a % of GDP at wartime exchange rates	Occupation costs and trade surplus as a % of GDP at 1937 exchange rates
1941	1,919,810	183,503	9.6	13.1
1942	2,267,014	205,213	9.1	12.4
1943	2,829,739	191,014	6.8	9.2
1944	3,423,568	405,377	11.8	16.2
1945	3,710,565	943,948	25.4	34.8
<i>c) Indonesia NI fl 000</i>				
	GDP current prices	Change in money supply	Change in money supply as a % of GDP at wartime exchange rates	Change in money supply as a % of GDP at 1937 exchange rates
1942	4,330,250			
1943	8,849,400	990,097	11.2	21.4
1944	23,517,900	1,302,015	5.5	10.6
1945	145,778,780	1,176,991	0.8	1.5

Source: Appendix

Table 2 Thailand and Indochina Composition of Payments to Japan, 1941-1945

<i>a) Thailand, baht 000</i>			
	Payments to Japan	Occupation costs %	Trade surplus %
1942	61,000	14.8	85.2
1943	176,050	93.0	7.0
1944	520,840	87.2	12.8
1945	800,910	96.8	3.2
<i>b) Indochina, piastres 000</i>			
1941	183,503	31.2	68.8
1942	205,213	41.7	58.3
1943	191,014	61.4	38.6
1944	405,377	88.8	11.2
1945	943,948	99.1	0.9

Source: Appendix

Table 3 Thailand and Indochina Methods of Financing Government Expenditure and Payments to Japan, 1941-1945

<i>a) Thailand baht m</i>						
	Conventional government expenditure	Yen credits	Total government expenditure	Government revenue % of expenditure	Money % of expenditure	Gold from Japan % of expenditure
1941	198.9		198.9	80.9	31.5	
1942	200.0	61.0	261.0	56.5	36.5	5.7
1943	261.1	176.1	437.1	48.4	60.6	6.6
1944	390.7	520.8	911.6	31.4	56.7	6.6
1945	425.2	800.9	1,226.1	25.7	75.7	2.0
<i>b) Indochina piastres m</i>						
	Conventional government expenditure	Occupation costs and trade surplus	Total government expenditure	Government revenue % of expenditure	Money % of expenditure	
1941	151	183.5	334.5	45.1	19.8	
1942	181	205.2	386.2	46.1	65.7	
1943	171.6	91.0	362.7	42.9	78.6	
1944	219.1	405.4	624.5	31.1	51.5	
1945	299.7	943.9	1,243.7	19.3	75.8	

Notes: Money is the change in money supply from official statistics. This change as a percentage of total government expenditure and government revenue as a percentage of total government expenditure does not add to 100% in any one calendar year. However, for both Thailand and Indochina over the five years 1941-1945 the totals for government expenditure plus money add to close to 500%. There were also small sales of bonds in the two countries but data for these sales are not available.

Source: Appendix.

**Table 4 Southeast Asia and Japan GDP per capita 1938-1950
(1990 Geary-Khamis \$ and index)**

	Burma	Malaya	Thailand	Indonesia	Indochina	Philippines	Japan
1938 GDP per capita	740	1,268	826	1,120	831	1,440	2,449
1938 =							
100	100	100	100	100	100	100	100
1939		99	100	98	107	105	115
1940		130	102	104	97	105	117
1941			102	110	92		117
1942			90	88	84		115
1943			98	70	79		115
1944			92	55	62		109
1945			83	48	49		55
1946			87	50	57	45	59
1947			94	57	60	61	63
1948			101	66	62	69	70
1949		125	100	72	68	71	73
1950	53	132	101	74	79	74	78

Source: Appendix

Table 5 Southeast Asia Characteristics of Inflation and Money during the Japanese Occupation, 1942-1945

	Burma	Malaya	Thailand	Indonesia	Indochina Saigon	Philippines
1. Ratio of prices at the end of occupation to prices at its Beginning	1,856.5	11,226.5	6.9	32.0	3.6	889.3
2. Ratio of quantity of currency at the end	16.4	25.1	7.1	11.0	5.7	28.0
3. Ratio of (1) to (2)	11.3	447.3	1.0	2.9	0.6	31.8
4. Average rate of rise in prices (% per month)	16.9	16.3	4.0	7.9	2.7	18.4
5. Average rate of rise in quantity of currency (% per month)	6.3	7.4	4.1	5.6	4.1	9.0
6. Ratio of (4) to (5)	2.7	2.2	1.0	1.4	0.7	2.0
7. Average rate of rise in prices during last year of occupation (% per month)	27.1	30.5	5.4	7.6	2.8	32.3
8. Ratio of (7) to (4)	1.6	1.9	1.4	1.0	1.0	1.8
9. Average rate of rise in prices during last two months of occupation (% per month)	72.1	86.8		14.0		37.2
10. Ratio of (9) to (4)	4.3	5.3		1.8		2.0
11. Real balances at end of occupation as a % of real balances at its beginning	9.0	2.0	102.7	34.3	171.8	3.2

Source: Appendix

Table 6 Southeast Asia Composition of Seigniorage, 1942-1945

	Seigniorage	Change in real base % seigniorage	Inflation tax % seigniorage
<i>a) Thailand, baht m</i>			
1942	70.6	-9.5	109.5
1943	130.9	26.3	73.7
1944	144.1	1.6	98.4
1945	134.8	-16.3	116.3
<i>b) Indochina Saigon, piastres m</i>			
1942	198.0	61.6	38.4
1943	169.7	34.5	65.5
1944	124.8	-47.2	147.2
1945	261.3	48.8	51.2
<i>c) Burma, rupees m</i>			
1944	44.4	10.3	89.7
1945	12.4	-308.3	408.3
<i>d) Malaya, dollars m</i>			
1942	23.2	-585.9	685.9
1943	14.9	-309.6	409.6
1944	9.6	-273.1	373.1
1945	4.8	-123.5	223.5
<i>e) Philippines, pesos m</i>			
1942	72.1	-55.0	155.0
1943	25.5	-551.0	651.0
1944	7.4	-678.1	778.1
<i>Indonesia, guilders m</i>			
1942	263.7	69.6	30.4
1943	141.3	-44.8	144.8
1944	83.3	-347.5	447.5
1945	36.8	-103.6	203.6

Note: For 1945 Burma seigniorage data are up to June 1945 and for 1945 seigniorage for Malaya and Indonesia data are until July 1945.

Source: Appendix

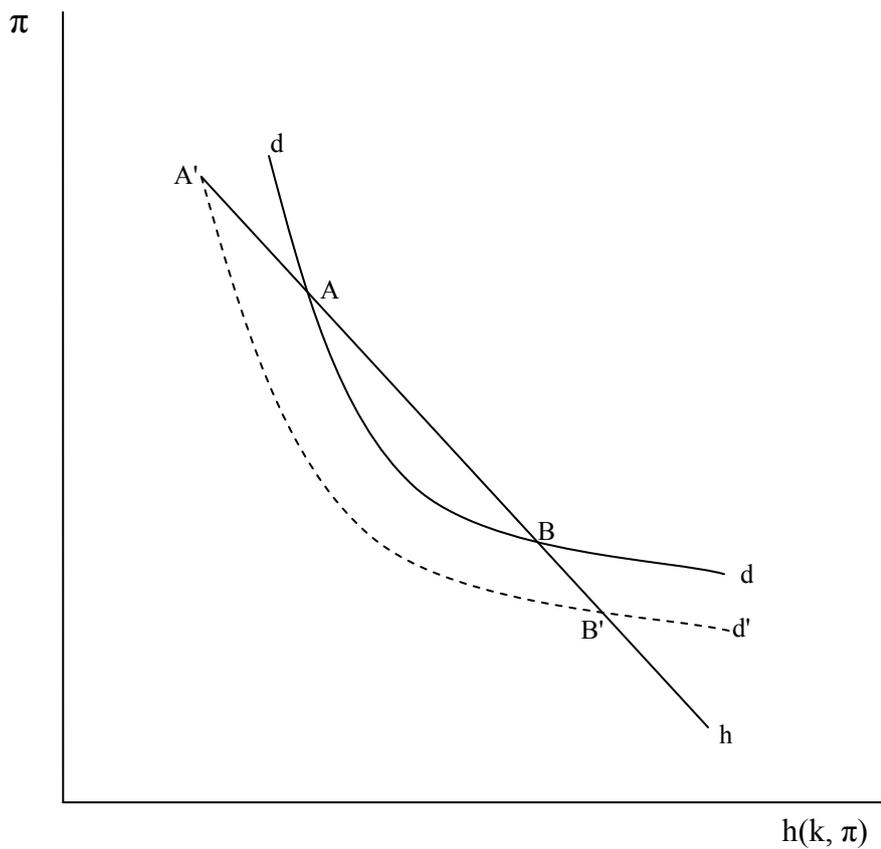


Figure 1 Seigniorage, money demand and dual equilibria

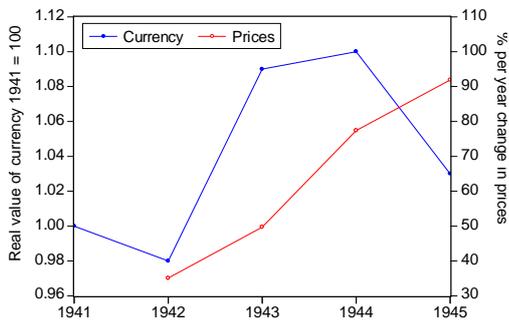


Figure 2 Thailand end-of-year index of real value of currency and rate of change in prices 1941 - 1945

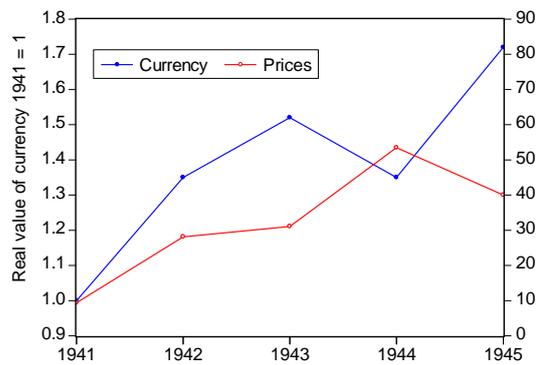


Figure 3 Indochina end-of-year index of real value of currency and rate of change of prices 1941 - 1945

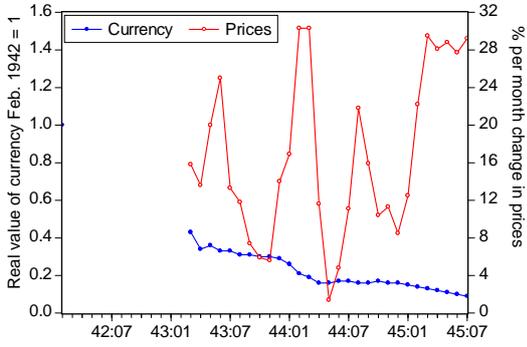


Figure 4 Malaya end-of-month index of real value of currency and rate of change in prices February 1942 - July 1945

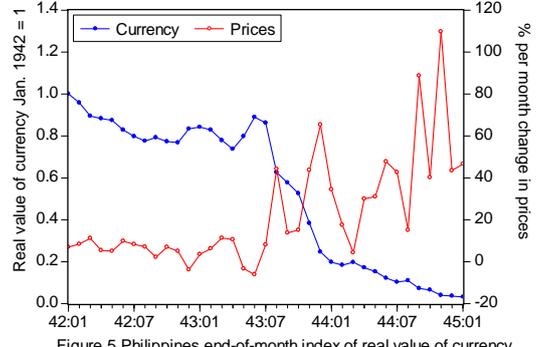


Figure 5 Philippines end-of-month index of real value of currency and rate of change in prices January 1942 - January 1945

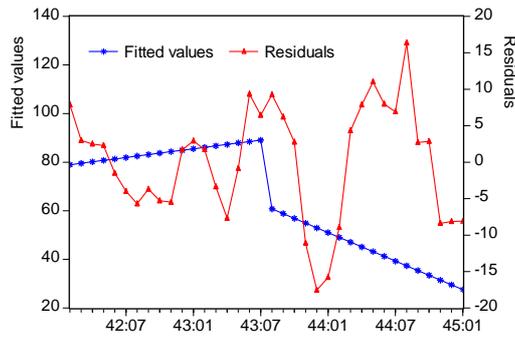


Figure 6 Philippines seigniorage fitted values and residuals 1942-1945