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# **Coins as gauge for growth VOC- *doits* to probe Java's deep monetisation, 1700–1800**

Alberto Feenstra, University of Amsterdam

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# Coins as gauge for growth

## VOC- *doits* to probe Java's deep monetisation, 1700-1800

Alberto Feenstra, University of Amsterdam

**Abstract:** During the eighteenth century the VOC imported over a billion small copper coins (*doits*) to Java, which is a remarkable operation for the world's largest enterprise at that time, since these coins were unfit to pay for the company's wholesale trade. This paper argues that the VOC responded to Java's specific need for small coins, because people increasingly relied on the market for daily necessities and became less dependent on subsistence farming. The alternative explanations of population growth, substitution and inflation do not satisfactorily explain the increased demand for these copper *doits*. Therefore, this paper proposes that Java's economy underwent a transformation, particularly after 1750.

**Keywords:** Economic History, Money Supply, Economic growth, Indonesia: Java.

**JEL Codes:** E410, E51, N150.

**Corresponding author:** Alberto Feenstra, [H.A.Feenstra@uva.nl](mailto:H.A.Feenstra@uva.nl).

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## 1. Introduction

Between 1724 and 1795 the VOC shipped more than 1.1 billion small copper coins of a type called *doit* [Dutch: duit] to Java.<sup>1</sup> The import of small change on such a scale seems odd, because these coins were too small to pay for the wholesale trade of the world's largest enterprise at that time. It seems even more so when we accept Sargent and Velde's argument that the minting of small coins was expensive and often unprofitable.<sup>2</sup> Therefore, Ryuto Shimada's explanation that the demand for copper in Java was so large that the VOC sold the *doits* as raw material is unconvincing: in that case the company could have saved the costs of minting by importing copper rather than minted coins.<sup>3</sup> Hence, we may assume the imports targeted a specific demand for small change.

Coins like the *doit* can be used to analyse how common the use of money is in a given society, since they are used for daily transactions. This phenomenon, which has been labelled "deep monetization", is considered important for the insight it provides into the penetration of money at an economy's deepest level, a level we cannot observe otherwise.<sup>4</sup> Moreover, following Kuznets, an increase of the money supply may indicate a shift away from subsistence farming, and perhaps even economic growth.<sup>5</sup> For, when a larger portion of the population depends on the market for buying their daily necessities, the transaction volume for which such small coins are needed consequently increases, which indicates structural changes of an economy.

These implications of monetary development make insights into changes in Java's monetary situation particularly relevant for the great debates about the causes of diverging economic developments between Asia and Europe. Kenneth Pomeranz and other members of the California School argued that the European and Asian economies showed remarkable resemblances until the middle of the eighteenth century.<sup>6</sup> More recently, Prasannan Parthasarathi also claimed that differences in welfare ratios arose between Europe and Asia – notably Britain and India – only during the nineteenth century.<sup>7</sup> Much less is known about Java's eighteenth-century economic performance. Analyses, such as Van Zanden's comparison of Dutch and Javanese economic structure of the supply of capital and skilled labour, start only in the nineteenth century, whereas most historiography concerning the Dutch-Javanese interaction under the VOC tends to focus on the period until 1740.<sup>8</sup> Hence, studying Java's deep monetisation improves our understanding of Asian eighteenth-century economic developments, and contributes to the *Great Divergence*-debate.

Whether economic growth was indeed the cause for the rising demand for small change is examined by exploring three alternative explanations first: population growth, substitution and inflation. The paper is structured as follows. Section 2 presents the *doit* circulation on the basis of VOC imports, local production and wearing of the coins. Section 3 estimates the size and growth of Java's population, which allows to correct the *doit* circulation for population growth by calculating the number of *doits* per capita. Section 4 examines the extent to which *doits* substituted barter or other types of money, while section 5 analyses the impact of inflation on the demand for small

<sup>1</sup> Bruijn, Gaastra, and Schöffer, *DAS*, I: Introductory volume:223–245.

<sup>2</sup> Sargent and Velde, *The Big Problem of Small Change*.

<sup>3</sup> Shimada, *Intra-Asian Trade*, 97.

<sup>4</sup> Lucassen, "Deep Monetization."

<sup>5</sup> Kuznets, *Population, Capital, and Growth*; Kuznets, *Modern Economic Growth*.

<sup>6</sup> Pomeranz, *The Great Divergence*; Frank, *ReOrient*.

<sup>7</sup> Parthasarathi, *Why Europe Grew Rich and Asia Did Not*.

<sup>8</sup> Zanden, "Rich and Poor before the Industrial Revolution"; We, "Re-thinking the Colonial Transition," 387.

change. Section 6 discusses Java's economic developments in relation to debate about the Great Divergence and Section 7 concludes.

**Figure 1: Map of Java under the VOC**



(Source: website VOC-kenniscentrum d.d. 23 October 2013)<sup>9</sup>

## 2. A pretty penny

To determine the development of the number of *doits* per capita, let us turn to the *doit* circulation first. The size of the circulation of VOC-*doits* in Java is determined by the net imports and local production minus the wearing rate. Because Batavia served as a rendezvous for the VOC in Asia, the *doits* shipped to Java were partially redistributed over other parts of Asia. Therefore, the re-exports must be subtracted from the more than 1.1 billion copper *doits* sent over from the Dutch Republic. By analysing these factors, this section demonstrates that the net imports dwarfed the local production, whereas the wear rate was low enough to create a sustained increase of the *doits* during the eighteenth century.

The data for the exports from the Republic show a regular influx of *doits* since the first issuance in 1724.<sup>10</sup> On average, the VOC sent over 87,000 guilders worth of *doits*, or approximately 15 million pieces per year. In Asia the *doit* was valued at four *doits* for a silver *stiver* [Dutch: *stuiver*] instead of eight in the Republic, because copper was valued higher in Asia than in Europe.<sup>11</sup> With time the numbers imported increased: from 11.1 million pieces during the 1730s to 257.6 million during the 1780s. Every decade, except for the 1770s, average annual imports rose compared to the previous decade.<sup>12</sup>

<sup>9</sup> <http://www.voc-kenniscentrum.nl/kaart-java.html>, downloaded 23 October 2013.

<sup>10</sup> Bruijn, Gaastra, and Schöffer, *DAS*, I: Introductory volume:226–245; on the cash flows of the VOC between Asia and the Republic see: Gaastra, *Particuliere Geldstromen Binnen Het VOC-bedrijf 1640-1795* and; Pol, *Schepen Met Geld*.

<sup>11</sup> Bruijn, Gaastra, and Schöffer, *DAS*, I: Introductory volume:185 For the remainder of the paper numbers are used, instead of monetary values, as much as possible to avoid confusion about exchange rates.

<sup>12</sup> The 1720s and 1790s counted only partially: the 1720s because the *doits* were only imported after 1724, whereas the VOC was nationalised in 1795 and no money was sent over thereafter in the eighteenth century.

**Table 1: The imported number of *doits* per decade**

	Number of <i>doits</i> p. decade	Av. p. year
1720s	1.280.000	1.611.429
1730s	111.200.000	11.120.000
1740s	101.600.000	10.160.000
1750s	161.880.000	16.188.000
1760s	188.000.000	18.800.000
1770s	104.160.000	10.416.000
1780s	257.600.000	25.760.000
1790s	144.000.000	28.800.000

Source: note 11.

The first shipments of *doits*, which arrived in Java in the 1720s, were mainly brought in circulation in Batavia and its surroundings to ease payments there. The issuance of the new coins was an immediate success; within a month of arrival all stocks were sold.<sup>13</sup> These rapid sales demonstrate a large demand for small change in Batavia. When the VOC first issued the *doits* in June 1724, the company announced that these coins were meant to supply the “*modest and other people, visiting the market there*”, with which they could buy “*things of little value.*”<sup>14</sup> Of course, the VOC did not provide the public with the coins out of pure charity; the company made a profit of 100% on the sales, because the *doits* valued at twice their exchange rate compared to their value in silver money in the Dutch Republic.<sup>15</sup>

Such lucrative profits provoked sailors to smuggle *doits* to Java and collect the revenue from this exchange rate difference there. The smuggling practices were, however, soon discovered because *doits* were found in the luggage of deceased seamen who had not survived the risky passage to Asia. Consequently, the VOC ordered that the *doits* put into circulation in 1724 “*for the convenience of the residents*”, to be withdrawn from circulation in December 1725.<sup>16</sup> To prevent further smuggling the VOC decided to mint its own *doits*, with a design different from those in the Republic; these *doits* depicted the VOC-monogram on one side and on the other the provincial arm of Holland and Zeeland, which were circulated in Asia from 1727 onwards.<sup>17</sup>

**Figure 2: VOC-*doits* from the mint houses in Zeeland and West-Friesland**

Source: private collection

<sup>13</sup> “NA, BGB” inv.nrs. 10817, f. 14r; 10818, f.14r; 10819, f.15r; 10820, f. 15r.

<sup>14</sup> Chijs, *Plakaatboek*, 1887, 4: 1709–1743:176–178.

<sup>15</sup> “NA, BGB” inv.nrs. 10817, f. 14r; 10818, f.14r; 10819, f.15r; 10820, f. 15r.

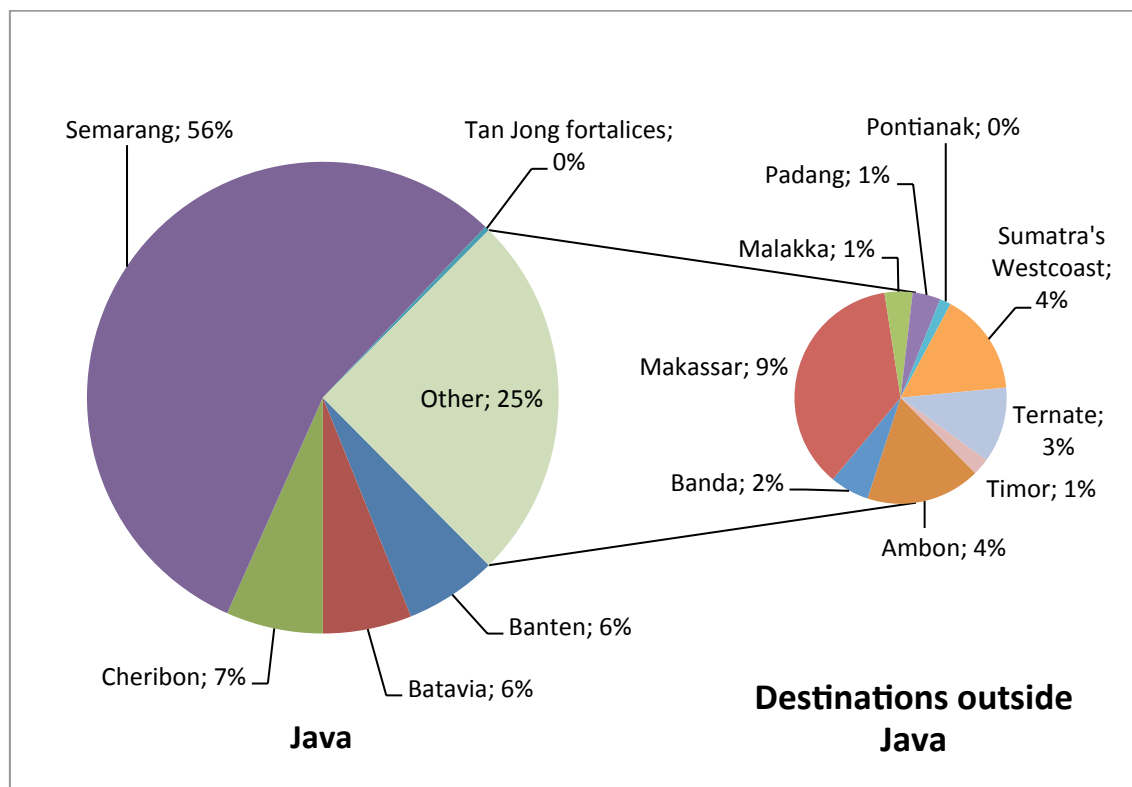
<sup>16</sup> Chijs, *Plakaatboek*, 1887, 4: 1709–1743:185–186.

<sup>17</sup> Ibid., 4: 1709–1743:201.

After the successful introduction of the *doits* in Batavia, the VOC gradually extended their distribution to other places in Java, which was facilitated by the company's territorial expansion. In 1733, for instance, the VOC introduced the *doits* in the Priangan regencies, which had come under company control in 1677.<sup>18</sup> For convenience of the poorer residents, especially for those living in the countryside, the VOC issued half *doits* in 1750.<sup>19</sup> During the second half of the eighteenth century, the majority of the *doits* were sent to the VOC office in Semarang, which acted as a gateway to both parts of the principality Mataram; 75 per cent of the *doits* distributed in Java went to Semarang.

Yet not all *doits* the VOC transported to Java remained on the island; these coins were partially redistributed to other parts of Asia as well. Approximately, the VOC sent 25 to 30 per cent to destinations outside Java – and consequently these re-exports did not contribute to Java's money supply. Already in 1728 29.4 per cent of the *doits* was forwarded to the Moluccas.<sup>20</sup> In 1730 28.4 per cent of the *doits* was re-exported, while in the 1750s this share was between 24 and 39 per cent.<sup>21</sup> Figure 3 shows that during the 1770s the VOC disseminated 75 per cent of *doits* in Java.<sup>22</sup> Consequently, on average 72 per cent of the *doits* was circulated in Java and 28 per cent was re-exported, which thus must be subtracted from the total imports.

**Figure 3: The structure of distribution of imported *doits*, 1770-1780**



Source: note 20.

<sup>18</sup> Jacobs, *Koopman in Azië*, 181; Chijs, *Plakaatboek*, 1887, 4: 1709–1743:348.

<sup>19</sup> Chijs, *Plakaatboek*, 1889, 6: 1750–1754:10.

<sup>20</sup> "NA, BGB" inv.nrs. 10817, f. 14r, 10818, f. 14r, 10819, f15r, 10820, f. 15r.

<sup>21</sup> Shimada, *Intra-Asian Trade*, 98.

<sup>22</sup> "NA, BGB" invr.nrs. 10675, 10676, 10677, 10678 and 10677.

Besides importing, the VOC sporadically minted *doits* in Java itself. In 1743, the VOC acquired the mintage right from the *susuhunan* [monarch] of Mataram and could henceforth legitimately mint coins. The VOC coined *doits* only twice in Java, in 1764 and 1783, when imports from the Republic faltered.<sup>23</sup>

Although the exact scale of production on Java is difficult to determine, an estimation can be made by using copper prices and the weight of the *doit*. For the minting of 1764-1765 3,050 pounds of copper were used.<sup>24</sup> Of these 3,050 pounds approximately 416,000 *doits* could be minted (the coins weighted 3.62 grams each), with a total market value of 5,205 guilders in Java.<sup>25</sup> From this gross value the costs for the production and the mint master's pay must be deducted to estimate the production. Furthermore, the boss and foreman of the armoury received 2 per cent of the copper value for the manufacture of planchets.<sup>26</sup> If we assume that the coin wages and other production costs were also about 2 per cent, the number of *doits* was approximately 400,000 pieces, with a retail value of 5,000 guilders on Java.

When the supply was disrupted again in 1783, as a result of the Fourth Anglo-Dutch War (1780-1784), the VOC's High Government in Batavia commissioned the local minting of *doits*, "*considering the great lack of doits among the society.*"<sup>27</sup> Consequently, silver money could not with any possibility be exchanged for copper cash.<sup>28</sup> The threat of the Sultan of Yogyakarta to mint coins himself if the VOC did not rapidly supply him with *doits* might have urged the company's administration to produce the coins.<sup>29</sup>

The production volume for 1783 is even more difficult to determine than for 1764, since it is unclear how much copper the High Government provided to mint the *doits*. Moreover, due to fraud at the mint, the authorization to mint *doits* was withdrawn in June 1783.<sup>30</sup> Probably this premature discontinuation led to a lower production than was planned. We therefore prudently assume that only half as many *doits* were produced in 1783 compared to 1764.

The production of the local mint, which produced merely 600,000 pieces in total, was rather modest compared the annual imports of 15 million pieces per year. This huge difference is evident in figure 4, which displays the eighteenth-century imports and local production.<sup>31</sup> Hence, the local mintage of *doits* had a marginal impact on the volume of the circulation in Java.

**Figure 4: The number of *doits* imported and locally minted, 1724-1800**

<sup>23</sup> Bruijn, Gaastra, and Schöffer, *DAS*, I: Introductory volume:226–245; Scholten, *De Munten van de Nederlandsche Gebiedsdeelen Overzee, 1601-1948*, 64.

<sup>24</sup> Shimada, *Intra-Asian Trade*, 102.

<sup>25</sup> Scholten, *De Munten van de Nederlandsche Gebiedsdeelen Overzee, 1601-1948*, 23.

<sup>26</sup> *Ibid.*, 64.

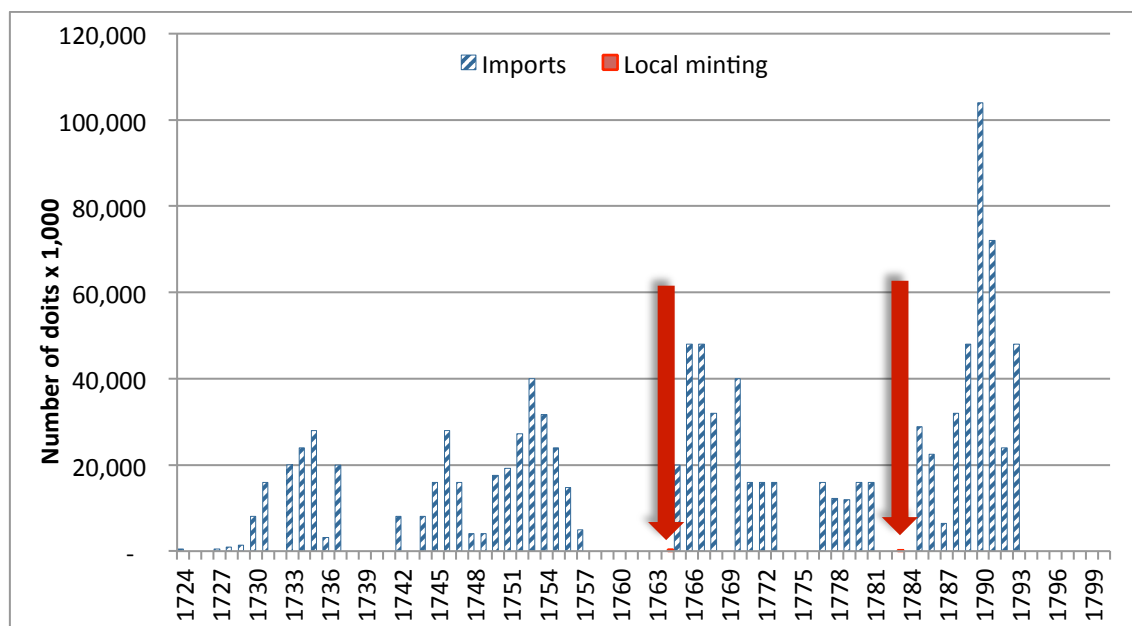
<sup>27</sup> Chijs, *Plakaatboek*, 1892, 10: 1776–1787:658.

<sup>28</sup> *Ibid.*

<sup>29</sup> Kwee, *The Political Economy of Java's Northeast Coast, c. 1740-1800*, 112.

<sup>30</sup> Chijs, *Plakaatboek*, 1892, 10: 1776–1787:659.

<sup>31</sup> The local minting in 1764 and 1783 are emphasized by adding arrows for those years. The sources for local production as mentioned in the text.



Sources: Bruijn, Gaastra, and Schöffer, *DAS, I: Introductory volume*:226–245 (imports) and my calculations, as in the text (local minting)

In addition to the net imports and local production, the wearing rates of the *doits* also modified the size of the money supply by decreasing the circulation. Systematic research onto the wear rate of *doits* is unfortunately lacking, which means that this has to be estimated by comparing known wear rates of other coins. Research in the Netherlands shows that 50 per cent of the 1-cent pieces issued in 1821 was returned in 1884, which equals an average annual wastage for unknown reasons of 1.09 per cent.<sup>32</sup>

A comparison with silver money allows for a first impression to differentiate between losses due to wear down and to other causes. The annual average weight loss of silver coins was about 0.32 per cent, whereas the total loss of the silver was 0.4 per cent annually.<sup>33</sup> Hence,  $\frac{3}{4}$  of the loss was due to wearing down. If we assume the same ratio applied to copper coins, 0.82 per cent must annually be subtracted from the existing stock of *doits*.

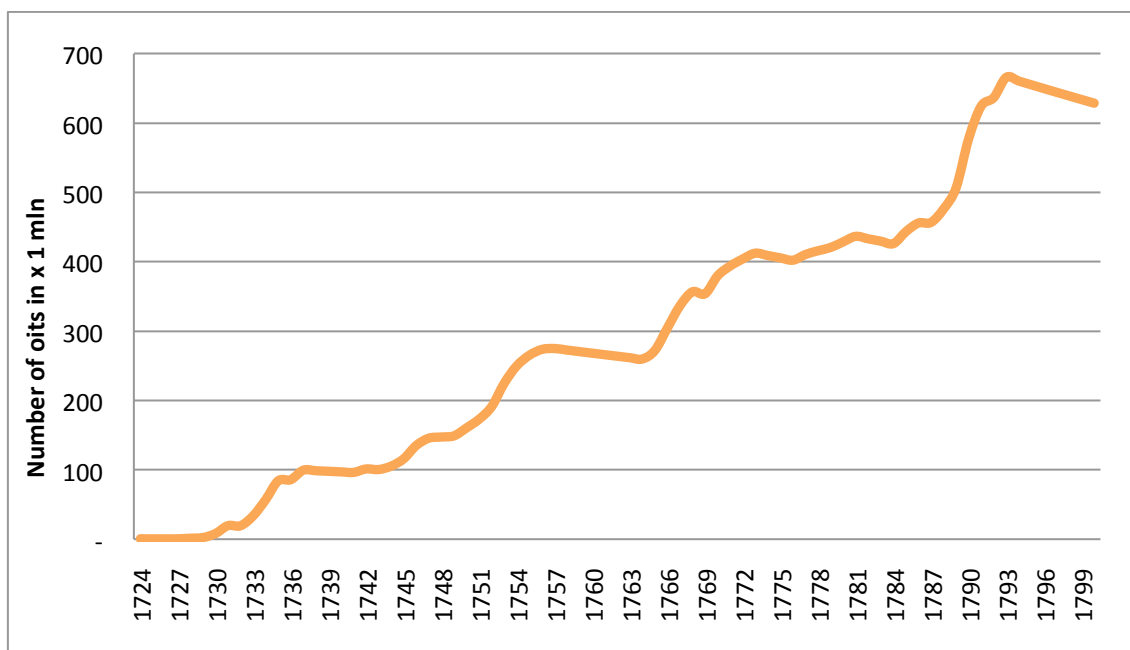
Taking all this together, the development of the number of *doits* in circulation is calculated as follows: each year the existing stock is reduced by 0.82 per cent, to which 72 per cent of the imports from the Republic are added, plus the total local currency production. This results in an average increase of 8.6 million pieces per annum, between 1724 and 1800, which means that by the end of the eighteenth century nearly 700 million *doits* circulated in Java.

**Figure 5: The number of *doits* in circulation**

<sup>32</sup> Hoitsema, "Over Samenstelling En Omvang Eener Metaal-circulatie," 922; Gelder, *De Nederlandse Munten*, 162, 187; The 1-cent pieces were slightly larger than the doits: Doits weight and size: 3.62 gram, 23 mm, 1 Ct. weight and size = 4.2 gram, 22mm.

<sup>33</sup> Hoitsema, "Over Samenstelling En Omvang Eener Metaal-circulatie," 941; Kuroda, "What Is the Complementarity Among Monies?," 9.





Source: my calculations, as in the text.

In the course of the eighteenth century, the *doits* spread out over the entire island. When imports were absent (in 1737-1742, 1757-1764, the early 1780s and after 1793) the number of *doits* in circulation decreased slightly, because local mintage was too limited to compensate for the worn down coins. Yet the volume of the *doit* circulation clearly shows an upward trend, adding up to a total of over 660 million pieces in circulation at the end of the eighteenth century, so Java's money supply can hardly be labelled as a very limited.<sup>34</sup> Nevertheless, whether this growth also resulted in a per capita increase of the *doits* is analysed in the next section.

### 3. Java's demographic development during the eighteenth century

Population growth is likely to increase the monetary demands of an economy. Hence, the degree of monetisation depends on the development of coins per capita. This section reconstructs Java's demographic figures during the eighteenth century, which allows us to calculate the number of *doits* per capita. That figure will subsequently be used as gauge for deep monetisation.

To make an estimate of Java's demographic development before the twentieth century, two issues need to be solved. Firstly, an estimate of Java's population size at the turn of the nineteenth century is required as a point of departure for the reconstruction of eighteenth-century developments. Secondly, a reconstruction of the eighteenth-century developments must be drawn up.

Although the precise pre-1900 developments are debated, a consensus exists about the general trend of Java's demography during this period: a series of wars and revolts caused low population growth or even decline from the late seventeenth until the mid-eighteenth century, followed by a period of growth that persisted into the twentieth century. This is useful as a first

<sup>34</sup> Zanden, "Linking Two Debates," 171.

indication for demographic development, but absolute figures are needed to calculate the number of *doits* per capita.

Estimates of the population size increasingly diverge when going back in time, due to dramatic improvements in the census methods during the nineteenth century.<sup>35</sup> The first complete and reliable data stem from the 1930 census, which counted 40.9 million inhabitants, whereas the estimated 30 million in 1900 is also generally accepted.<sup>36</sup> Less consensus exists about the population size around 1800, although Raffles' contemporary estimate of 4.6 million Javanese in 1815 is nowadays deemed too low.<sup>37</sup>

Several scholars have made estimates of early nineteenth-century population figures. Anthony Reid estimated a population of approximately 5 million in 1800, Boomgaard and Gooszen calculated 7.5 million in that year, while Van Zanden presented an estimated population size of 8.4 million in 1815.<sup>38</sup> Because Boomgaard and Gooszen's 7.5 million is strongly substantiated and results in the most conservative figure for the number of *doits* per capita in 1800, their estimate is used in the rest of the paper.

**Table 2: Estimates of Java's population size (1800/1815)**

Author	Population (in millions)	Year
Raffles	4.6	1815
Reid	5.0	1800
Boomgaard & Gooszen	7.5	1800
Van Zanden	8.4	1815

Source: note 37 and 38.

From this point of departure we can reconstruct Java's eighteenth-century population figures, by using tax records and comparing nineteenth-century population statistics, which serve as complementary tools. Pre-1800 censuses are lacking, but native tax registers can be used to gauge growth rates. These tax registers counted a number of tax units, the *cacah*, which referred to a number of people, usually four to six, but sometimes as much as thirty persons.<sup>39</sup> Hence, a number of *cacah* cannot simply be transformed into concrete population figures, so we need to be careful when using these tax registers.

Despite this limitation, we can get an indication of population growth by comparing the registers over time. Merle Ricklefs infers from two *cacahs* of 1755 and 1773-1774 that the Javanese population grew by a rate of at least 0.9 per cent per year.<sup>40</sup> He also concludes that the number *cacah* in 1755 is almost certainly too high, which means that the actual growth rate was higher than the calculated one. Consequently, Ricklefs considers a growth of at least 1 per cent

<sup>35</sup> Boomgaard and Gooszen, *Population Trends 1795-1942*, 29, 82.

<sup>36</sup> Ibid.; Zanden, "Economic Growth in Java"; Eng, *Agricultural Growth in Indonesia*, 269; Christie, "States Without Cities," 23.

<sup>37</sup> Christie, "States Without Cities," 23.

<sup>38</sup> Reid, "Low Population Growth and Its Causes," 36; Boomgaard and Gooszen, *Population Trends 1795-1942*, 82; Zanden, "Economic Growth in Java," 3. Van Zanden's estimate for 1815 results in an estimation of 6.7 Javanese in 1800.

<sup>39</sup> Ricklefs, *Jogjakarta Under Sultan Mangkubumi*, 71; Ricklefs, "Some Statistical Evidence," 2; Boomgaard extensively discussed the subject in the appendix to his PhD-thesis: Boomgaard, *Children*, 298-309; Nagtegaal, *Hollandse Tijger*, 49-50; Carey, "Waiting for the 'Just King'," 68.

<sup>40</sup> Ricklefs, "Some Statistical Evidence," 30.

per year to be very plausible.<sup>41</sup> Other scholars agree that this growth rate in the period 1755-1800 is likely.<sup>42</sup> So we may assume that the Javanese population increased by 1 per cent per year during the second half of the eighteenth century and perhaps by more.

A comparison with nineteenth-century population growth provides support for this estimate. From the literature it is clear that overall conditions for demographic development changed little between 1755 and 1820.<sup>43</sup> Firstly, there was a lasting peace after the treaty of Gyanti in 1755, which continued until the Java War (1825-1830).<sup>44</sup> The absence of war probably led to an increased birth rate, since the impact of wars on the slow demographic growth in early modern Asia was mainly in delaying births and not in the immediate increase in mortality.<sup>45</sup> Secondly, Javanese agriculture experienced a period of unprecedented growth from 1755: both rice production and the number of new *sawahs* (irrigated paddy or rice fields) increased.<sup>46</sup> Thirdly, major epidemics were absent until the outbreak of cholera in 1821.<sup>47</sup> Though the population suffered structurally from smallpox to about 1820, since the colonial government only deployed the smallpox vaccine effectively in Java from 1818-1820, we can reasonably assume that the smallpox had the same inhibitory effect on the population as before.<sup>48</sup> This continuity in the demographic conditions means that knowledge of the period from 1800-1820 can be used to estimate growth over the period 1755-1800.

In order to make this backward projection, an estimate is required of the growth between 1800 and 1820. We try to estimate this growth by confronting two approaches. The first is an interpolation between the population estimates of 7.5 million in 1800 and 14 million in 1850, which results in an annual average growth rate 1.26 per cent.<sup>49</sup> However, after 1820 demographic conditions changed: the Java war and cholera epidemic caused incidental hiccups in the growth, whereas both the smallpox vaccination and an increase in the birth rate after the introduction of the cultivation system in 1830 fostered population growth.<sup>50</sup>

The second approach examines the crude birth and death rates, prior and after 1820. Boomgaard assumes that the pre-vaccination Indonesian crude death rate was approximately 50‰, to which smallpox contributed 10‰.<sup>51</sup> For the period 1820-1850 Boomgaard estimated an annual growth rate of 1.25%, which consisted of a crude birth rate (CBR) of 57‰ and a crude death rate (CDR) of 44.5‰. Further, the CBR and CDR were 54‰ and 36.5‰ respectively in the period thereafter, when large epidemics were absent, smallpox vaccination was fully effectuated – around 1860 – and the cultivation system was abolished around 1870.<sup>52</sup> Hence, except for the devastating effects of smallpox epidemics, the demographic conditions after 1850 were rather similar to the period prior to 1820.

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<sup>41</sup> Ibid.

<sup>42</sup> Boomgaard, "Morbidity and Mortality," 50; Reid, "Low Population Growth and Its Causes," 35.

<sup>43</sup> Carey, "Waiting for the 'Just King'," 105.

<sup>44</sup> Ricklefs, *Jogjakarta Under Sultan Mangkubumi*, 21.

<sup>45</sup> Reid, "Low Population Growth and Its Causes," 42-43; Boomgaard, "Bridewealth and Birth Control"; Boomgaard, "Female Labour and Population Growth"; Boomgaard, *Children*, 275-280; Boomgaard, "Morbidity and Mortality," 65.

<sup>46</sup> Carey, "Waiting for the 'Just King'," 89-91.

<sup>47</sup> Boomgaard, "Morbidity and Mortality," 49; Carey, "Waiting for the 'Just King'," 105-106.

<sup>48</sup> Boomgaard, "Pokken En Vaccinatie Op Java 1780-1860: Medische Gegevens Als Bron Voor Demografisch Onderzoek," 121.

<sup>49</sup> Boomgaard and Gooszen, *Population Trends 1795-1942*, 82.

<sup>50</sup> Boomgaard, "Female Labour and Population Growth."

<sup>51</sup> Boomgaard, "Smallpox, Vaccination, and the Pax Neerlandica Indonesia, 1550-1930," 600.

<sup>52</sup> Boomgaard, *Children*, 249.

Table 3: Crude Birth and Death Rates 1820-1880

Period	Crude Birth Rate (‰)	Crude Death Rate (‰)	Natural increase (%)
1820-1850	57	44.5	1.25
1850-1880	54	36.5	1.75

Source: note 52.

Since smallpox increased the annual mortality by 10‰ this must be added to the 36.5‰ CDR of the period after 1850, which then totals to 46.5‰. If, for the sake of argument, we assume that the increase in the CBR due to the cultivation system equalled half of the decline thereof after 1850, then the CBR before 1820 would be 55.5‰, which leads to a natural increase of 0.9 per cent per year. This figure is significantly lower than the 1.26% calculated through interpolation. Probably the actual population growth rate was between these upper and lower estimates. Therefore, the average of 1.1% annual growth is a likely estimate for the growth of Java's population between 1755 and 1820.

An estimate for the period until 1755 is perhaps even more uncertain than for the period thereafter. Again the tax registers offer some leads. Based on the *cacahs* of 1652 and 1755 Reid arrives at an average annual decline of the population of 0.28 per cent.<sup>53</sup> This decline was the result of wars and uprisings that took place between 1675 and 1755 in the principality Mataram.<sup>54</sup> Most of the Javanese population lived in this principality, which experienced peace in only 35 years out of the 80 years before 1755. Periods of war and peace alternated so that there was no linear development, which means we must differentiate our estimates between wartime decline and peacetime recoveries.

The increase in the number of taxpayers in Banten (West-Java) between 1694 and 1715 provides us with an indication of peacetime population growth. In this for Banten peaceful period the number of taxpayers increased by 14 per cent, which equals an average annual growth rate of 0.62 per cent.<sup>55</sup>

As Reid suggested, war was the main obstacle to population growth in Southeast Asia in the early modern period. The combination of increased mortality and a falling birth rate caused a population decline, averaging 0.28 per cent per year between 1652 and 1755. On the basis of the above-mentioned growth rate in the peace years, this means that during conflicts the population annually declined with 1.47 per cent.

The resulting estimate of the population development is as follows (see: figure 6). Around 1700 the Javanese population counted about 5.7 million people, which declined to approximately 5 million in 1708, because it suffered from the uprising of Surapati (1686-1703) and the subsequent First Javanese War of Succession (1703-1708).<sup>56</sup> Until the outbreak of the Second Javanese War of Succession (1718-1723), the population recovered to an estimated size of 5.4 million, only to decline to the level of 1708 during that war. From 1723 relative tranquillity is likely to have instigated population growth to 5.6 million in 1740. That year the Chinese Rebellion (1740-1745)

<sup>53</sup> Reid, "Low Population Growth and Its Causes," 46.

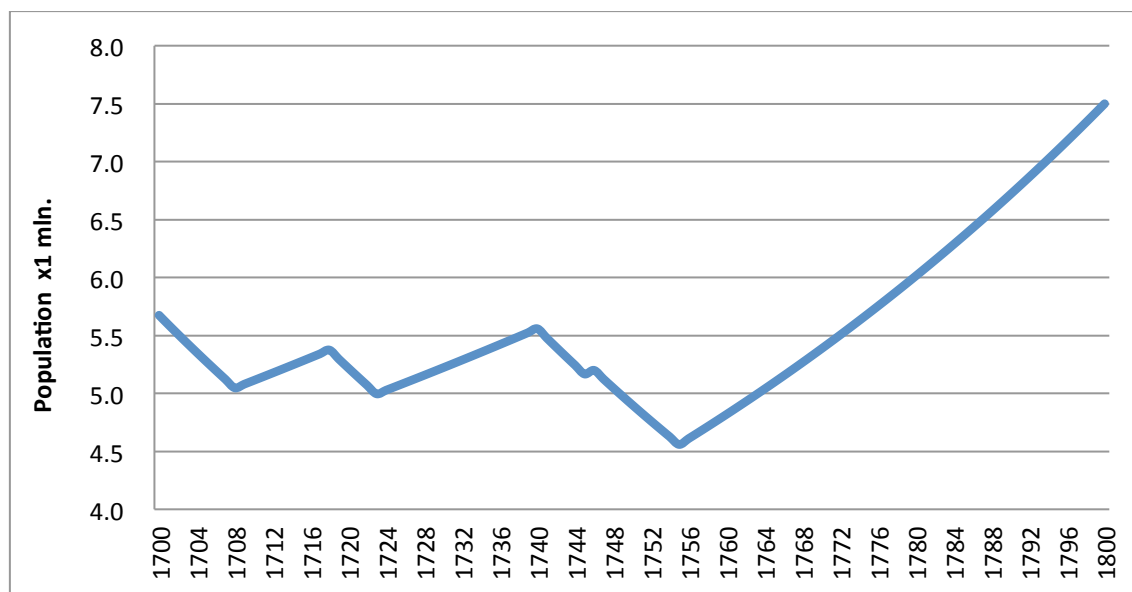
<sup>54</sup> Ricklefs, *Jogjakarta Under Sultan Mangkubumi*, 20–21, 44; Nagtegaal, *Hollandse Tijger*, 17–21.

<sup>55</sup> Talens, *Een Feodale Samenleving in Koloniaal Vaarwater*, 98, 232.

<sup>56</sup> Ricklefs, *Jogjakarta Under Sultan Mangkubumi*, 20–21, 44; Nagtegaal, *Hollandse Tijger*, 17–21.

broke out, almost immediately followed by the Third Javanese War of Succession (1746-1755).<sup>57</sup> As a result, the population decreased to about an estimated size of 4.6 million people. The treaty of Giyanti ended the wars and unrest in 1755, which translated into a constant population growth of about 1.1 per cent per year until the outbreak of the cholera epidemic in 1821. Consequently, the Javanese population at the end of the eighteenth century probably counted approximately 7.5 million people.

**Figure 6: Estimated population size in Java, 1700-1800**



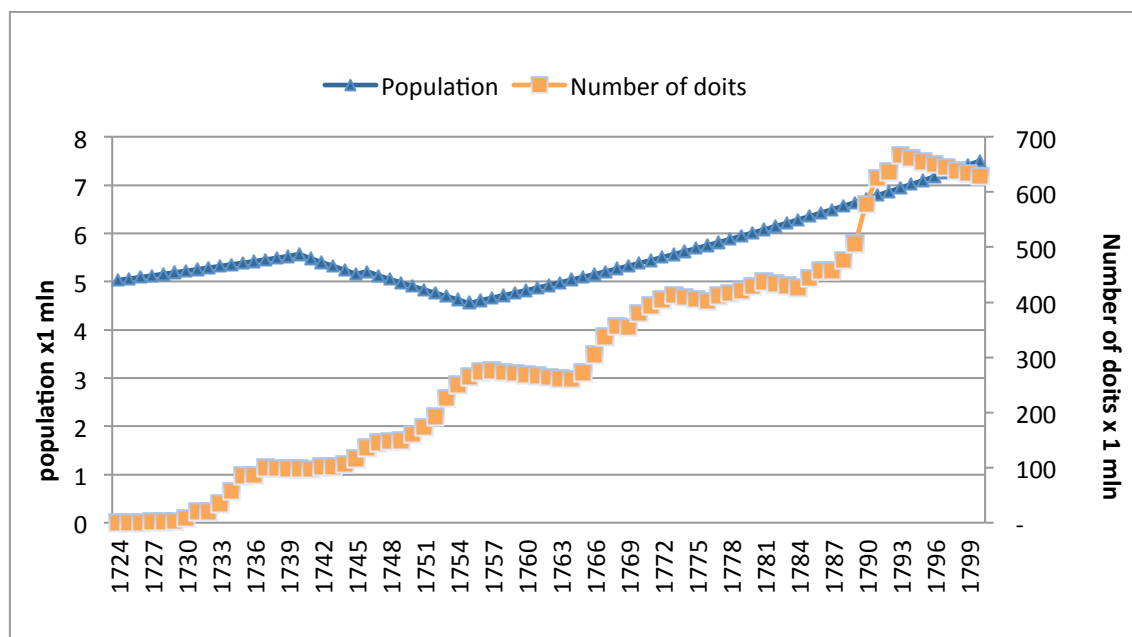
Source: my calculations, as in the text.

#### 4. The impact of the *doit*: substitution

We can now estimate the number of *doits* per capita and start analysing what effects the large *doit*-influx may have had on the existing small money supplies, the price level and money usage. From figure 7 it is clear that the growth rate of the *doits* markedly outstripped the population growth, so the number of *doits* per capita increased throughout the eighteenth century, to peak at 96 *doits* per capita in 1793. When at the end of the eighteenth century the imports came to a halt, the Javanese population still increased, so the number of *doits* per capita declined.

**Figure 7: Population size and total number of *doits* in circulation**

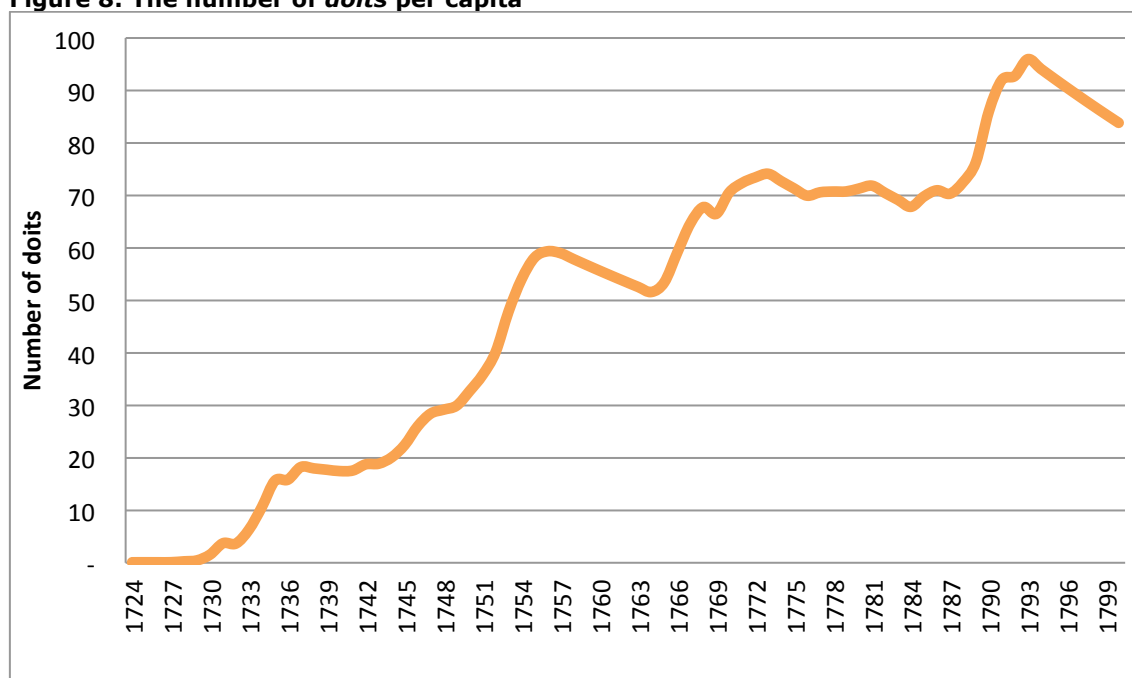
<sup>57</sup> Ricklefs, *Jogjakarta Under Sultan Mangkubumi*, 20–21, 44; Nagtegaal, *Hollandse Tijger*, 17–21.



Source: my calculations, as in the text.

The strongest per capita growth occurred during the first half of the eighteenth century, when population growth stabilised and the total number of *doits* increased. During that period, total circulation rose to 265 million pieces in 1755, resulting in an average of 58 *doits* per capita. Between 1755 and 1793 the number of *doits* per capita increased from 58 to 96 pieces, which equals an average growth rate of 1.33 per cent per year. During the second half of the eighteenth century, both the number of *doits* in circulation and the population increased, decelerating the growth in per capita *doits*, despite a tripling of the absolute number of *doits* in circulation.

**Figure 8: The number of *doits* per capita**



Source: my calculations, as in the text.

The influx of the *doits* probably affected the Javanese economy. An increase of coins per capita could have caused inflation, a subject to which we return in the next section. Further, the increase in *doits* may have led to replacing existing coins. This substitution process can also explain the increased demand for VOC-*doits* and hence have reduced the increase of the small coin supply as a whole.

This section examines two forms of substitution: monetary substitution – one currency replacing another – and substitution of barter. Of course, merely the smaller coins could have been substituted by the *doits*, because their monetary function had to be comparable. Consequently, there is not – as generally assumed – one homogeneous money supply (M), but multiple money supplies that serve and circulate in their distinct parts of the economy, making them complementary to each other.<sup>58</sup>

Java's economy was monetised to a certain extent before the VOC introduced the *doit* in 1724. By then the VOC had already shipped money and bullion to Java for over a century. Moreover, the Javanese were already familiar with monetised transactions before the Europeans arrived on the island. The smaller denomination coins spread by the VOC are discussed below; the section starts with examining the presence of Asian coins in Java.

When the Portuguese first visited Java in the sixteenth century, several types of cash coinage circulated. The Portuguese called them *caixas*, the Dutch – later during that century – *casjes*.<sup>59</sup> This term was used indiscriminately for both *kepengs* and *picis*; although in practice these terms were often used interchangeably, this paper distinguishes between copper *kepeng* and tin-lead alloyed *picis*. This interchangeability in terminology is understandable since the two types were rather similar; small coins with a hole in the middle, which enabled stringing them together into a larger unit of account. Copper scarcity in China triggered the production of cheaper lead substitutes in the late sixteenth century, as it had done before.<sup>60</sup>

Originally, these coins were cast in Southeast China and shipped by Chinese merchants, who used them to buy pepper and pay for their daily necessities.<sup>61</sup> Gradually the formerly bartered economy of Banten's hinterlands became monetised.<sup>62</sup> At least from the 1430s onwards *picis* were fabricated on Java itself, in response to insufficient supplies from China.<sup>63</sup> This demonstrates that Javanese were so accustomed to the use of low value money for daily transactions, that they were willing to solve scarcity problems when they arose, which suggests that Java's economy was already monetised to a certain extent before the introduction of the *doits*.

Since the *picis* were made of inferior quality metals, while the copper *kepengs* had become scarce from the late sixteenth century onwards, their value was well below the latter currency: around 1700, a string of 50 tin-lead *picis* had the same value as one silver *double stiver*, which means that one *doit* was worth 6.25 *picis*, while 24 copper *kepengs* are reported to be exchanged against one *double stiver*, and thus one copper *doit* was worth three *kepengs*.<sup>64</sup>

Moreover, the poor quality of the tin-lead alloyed *picis* made them brittle, causing a high wearing rate; a carefully handled *pici* had a lifespan of approximately three to four years. This

<sup>58</sup> Kuroda, "Concurrent but Non-integrable Currency Circuits."

<sup>59</sup> An extensive reconstruction is made by: Aelst, "Majapahit Picis; The Currency of a 'Moneyless' Society 1300-1700," 369; And a broader context is given by: Wicks, *Money, Markets, and Trade in Early Southeast Asia*.

<sup>60</sup> Blussé, *Strange Company*, 38; Mitchiner, "Coin Circulation in Palembang," 23.

<sup>61</sup> Blussé, *Strange Company*, 43.

<sup>62</sup> Ibid., 39, 43, 46-47.

<sup>63</sup> Mitchiner, "Coin Circulation in Palembang," 23; Christie, "States Without Cities"; Blussé, *Strange Company*, 45-47.

<sup>64</sup> Valentijn, *Oud En Nieuw Oost-Indiën*, 3:556; Nagtegaal, *Hollandse Tijger*, 186.

high wearing rate had two major consequences for the use of the coins: they were unfit to store value, which made them unsuitable as hoarding money and hence stimulated the circulation, and secondly, the circulation needed continuous new supplies in order to remain constant. Put another way, without new supplies the coins would rapidly disappear from circulation.

This is precisely what happened around the mid-eighteenth century in Java. In 1744 the VOC attempted – vainly – to issue their own minted *picis*, but was eventually left with huge unsold stocks. It was then decided to lease-out the *pici*-minting to Chinese minters, who met with the same problem somewhat later and lamented that the *picis* were not used.<sup>65</sup> This unpopularity of the *pici* can easily be related to the popularity of the alternative small coin in circulation now: the VOC-*doit*. In 1739, for instance, the shortage of small change was so pressing that the exchange of big money yielded a 10 per cent premium, because the Javanese were “very fond of that specie [i.e. small change].”<sup>66</sup> This is in line with the observation about the rapid sales of the first *doits* in the 1720s.<sup>67</sup> Furthermore, the demand for *doits* had eliminated the market for *picis* so the company cancelled the lease of *pici*-minting formally in 1763, despite the apparent lack of small coins, which incited them to mint *doits* locally a year later.<sup>68</sup> In this light the opinions of Shimada and Blussé, who argued that the Javanese kept preferring *picis* and only slowly and reluctantly accepted the *doits* instead, must be revised.<sup>69</sup> Moreover, it seems that the VOC had misjudged the success of the *doit*: exactly at the moment that they tried to link-up with the existing payment modalities, the demand for the local coinage disappeared due to the popularity of their own *doit*.

Besides the local currencies, the *doit* also influenced the usage of other currencies the VOC issued in Java, mainly the silver *double stivers* (Dutch: *dubbele stuivers* or *dubbeltjes*). The *doit* was by no means the first Dutch coin the VOC shipped to Asia, although for the most part of the seventeenth century the imports of small coinage had remained rather limited; approximately 8% of the coins and bullion exported to Asia consisted of small silver change. These coins were categorised as “*payement*”, unspecified small change, which were almost exclusively silver coins, although copper farthings (Dutch: *oordjes*) are mentioned once: a sum of 5,000 guilders in 1653–1654. Only from the 1680s onwards the company shipped larger amounts of silver small coins of a type called *double stivers* to Asia. Whereas the VOC exported ‘merely’ 400,000 worth of *double stivers* during the seventeenth century, approximately 13.1 million guilders worth was sent to Asia during the subsequent century. The bulk of these *double stivers* was exported between 1700 and 1730: more than 7.5 million guilders worth was exported during these three decades.<sup>70</sup> However, after 1730 the number of imported *double stivers* dropped noticeably.

### Figure 9: The export of *doits* and *double stivers* to Asia by the VOC, 1700–1795

<sup>65</sup> Kwee, *The Political Economy of Java's Northeast Coast, c. 1740–1800*, 100–101.

<sup>66</sup> Chijs, *Plakaatboek*, 1887, 4: 1709–1743:537.

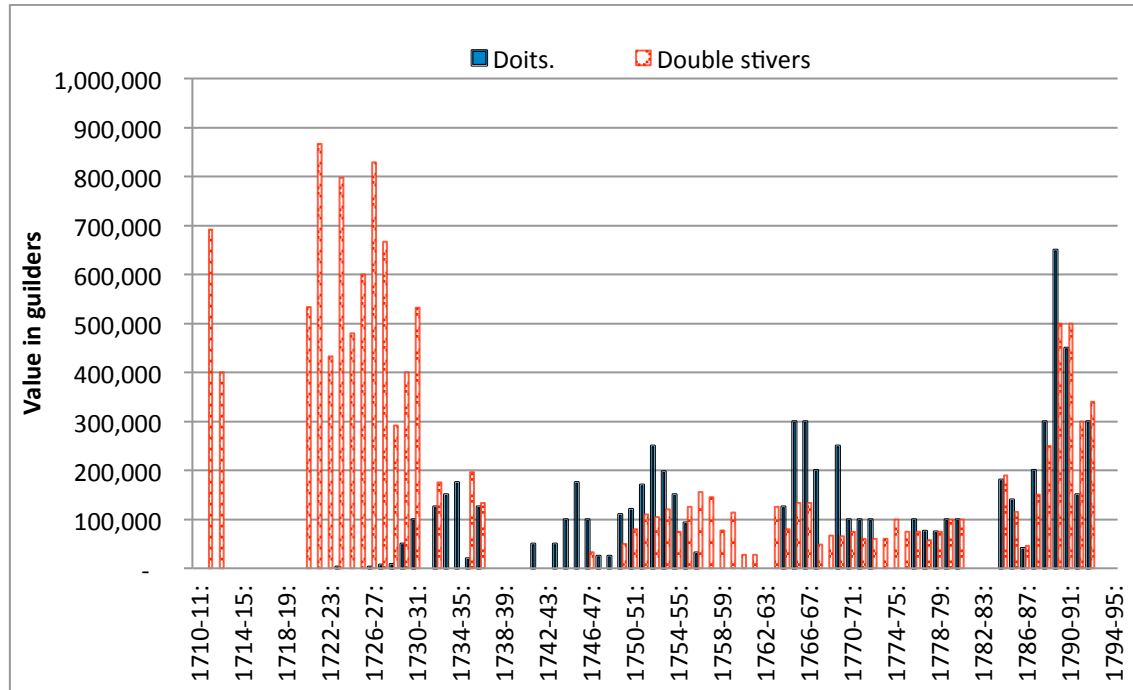
<sup>67</sup> “NA, BGB” inv. nr. 10818, f. 14; inv. nr. 10819, f. 15; inv. nr. 10820, f. 15;.

<sup>68</sup> Chijs, *Plakaatboek*, 1890, 7: 1755–1764:680.

<sup>69</sup> Blussé, *Strange Company*, 97; Shimada, *Intra-Asian Trade*.

<sup>70</sup> Bruijn, Gaastra, and Schöffer, *DAS*, I: Introductory volume:226–245.





Source: Bruijn, Gaastra, and Schöffer, *DAS, I: Introductory volume*:226–245.

It is, probably, no coincidence that the imports of *double stivers* began to decrease at exactly the moment the VOC had dealt with the initial smuggling issues of the *doits*, by minting them with the VOC-monogram. Kwee explained this phenomenon by arguing that the VOC was unable to send sufficient amounts of silver bullion and money and therefore sent copper *doits* instead.<sup>71</sup> But this is unlikely for several reasons. Firstly, the High Government had already in 1688 requested the Board of Directors in Amsterdam to send over smaller denomination coins and expressed the need for coins with a lower value than the single *stiver* – not a higher value.<sup>72</sup> Secondly, the Sultan of Yogyakarta required copper coins rather than silver in 1783. Thirdly, Arent Pol concluded that there was very little need for silver *stivers* in Java, from his analysis of the compliance with the so-called “*demand of India*” – in which the High Government estimated the amount of money and bullion needed to receive from the Republic.<sup>73</sup> Fourthly, the VOC was perfectly capable of sending over large amounts of silver to Java – including *double stivers* – as becomes clear from the overview in *Dutch-Asiatic Shipping*. From figure 9 it is apparent that during the late 1750s and early 1760s the VOC imported *double stivers* and no *doits*, coinciding with the decision of the company to mint *doits* locally, because of the scarcity of small change. In other words, the scarcity of *doits* sent over from the Republic stimulated local minting of *doits* and was additionally compensated for by increased imports of *double stivers*. Moreover, merely 1.18 per cent of the VOC’s total exports of bullion and coins consisted of *doits*, while at least 77.98 per cent consisted of silver.

**Table 4: Distribution of exported bullion and coin types by the VOC**

<sup>71</sup> Kwee, *The Political Economy of Java’s Northeast Coast*, c. 1740-1800, 105.

<sup>72</sup> *Generale Missiven van Gouverneurs-generaal En Raden Aan Heren XVII Der Verenigde Oostindische Compagnie*, 1975, V 1686–1697:189.

<sup>73</sup> Pol, “Tot Gerieff van India,” 96.

Material	Percentage
Copper	1.18%
Unknown	8.66%
Precious metals	90.17%
Whereof:	
Unspecified silver/gold	1.31%
Gold	10.87%
Silver (large)	69.18%
Silver (small/"payment")	8.80%
Subtotal Gold/Silver	90.17%
Total	100.00%

Source: Bruijn, Gaastra, and Schöffer, *DAS, I: Introductory volume*:226–245.

Finally, table 5 shows that the amount of silver money sent over exceeded the demand formulated in Batavia for the years 1779-1780.<sup>74</sup> It is, therefore, much more likely that the presence and imports of *doits* reduced the demand for *double stivers* considerably, than that the VOC would have been unable to provide enough silver. Rather, the opposite seems to have been the case: the VOC could provide sufficient silver *double stivers* but could not meet the demand for copper *doits*.

**Table 5: India's demand and actual shipment, 1779-1780**

Required amount	Bullion / coin type	Amount exported from the Republic	Bullion / coin type	Percentage shipped
800,000	Gold ingots	1,400,000	Gold ingots	175%
150,000	Re-edged Ducats	150,000	Gold Ducats	100%
1,600,000	Silver ingots (11 pennies, 20 grains fineness)	2,600,000	Silver ingots	163%
1,000,000	Reals	1,794,000	(mark) Reals	299%
		1,200,000	New Spanish Reals	
50,000	Ducatoons	400,000	Ducatoons	800%
		200,000	Half ducatoons	0%
100,000	"paijement" / small change	50,000	Shillings	150%
		100,000	Double stivers	
100,000	copper <i>doits</i>	100,000	Doits	100%
3,800,000	Total	7,994,000	Total	210%

Source: note 74.

Hence, the greater popularity of the more durable *doit* made it impossible to sell or issue *picis* for the Company and the Chinese minters alike, which means that around 1750 the amount of *doits* in circulation was sufficient to take over the function of the *picis* as a means of exchanges for daily usage. If the absence of the *picis* had paralysed payments, the Javanese would still have accepted them, although perhaps reluctantly and at a lower exchange rate. This was, however, not the case: they simply refused the *picis*, which suggests that the market was saturated with coins.

<sup>74</sup> "NA, VOC" inv.nr. 3471, f. 169; Bruijn, Gaastra, and Schöffer, *DAS, I: Introductory volume*:226–245.

Therefore, we may conclude that until about 1750 the *doits* were circulated together with the *picis*, but substituted them thereafter.

Moreover, as a consequence of their high wear rate the *picis* still in circulation must have disappeared within a few years, after the last coins had been brought into circulation, which means that they can safely be ignored after 1755 for estimating Java's monetisation. On the other hand, although the imports of the *double stivers* seem to have been correlated negatively with the imports of the *doits*, they were by no means driven out of circulation. Rather the larger *double stiver* was complementary to the *doit*. Thus, after 1750 every issuance of *double stivers* or *doits* probably increased the money supply for the segment of daily transactions.

Whether in addition to the silver *double stivers* and copper *doits* other more durable small coins were brought into circulation is impossible to tell with a satisfactory level of certainty. Nonetheless, the Sultan's 1783 threat to issue coins himself suggests that he relied primarily on the VOC to supply his lands with coins. We can therefore conclude that the money circulation in Java's interior depended on VOC-imports. Whether this was also the case for the coastal area, where smuggling was easier, cannot be proven. Repeated bans on importing copper *kepengs* suggest that smuggling was a common phenomenon, although its volume is impossible to determine. This, however, would only have increased the small change supply and thus Java's monetisation.

Although it is likely that the introduction of the *doit* in Java changed the types of coins that were available for small transactions, the question is to what extent people started using *doits* for previously bartered transactions. To answer this question the substitution of *picis* for Dutch small coins is useful for estimating the importance of barter. Java's daily transactions became increasingly monetised from the late sixteenth or early seventeenth centuries onwards, and perhaps this process had even started as early as the fifteenth century.<sup>75</sup> During that period, *kepengs* and *picis* already largely substituted the barter transactions. It is impossible to gauge the exact influence of this process on the monetisation of the Javanese economy until the turn of the eighteenth century. Of course, a further decrease of barter transactions due to an increase of payments performed with *doits* would have reduced the estimated degree of monetisation. However, considering that Java's monetisation had already progressed considerably, the substitution for bartered transactions was probably limited.

Thus, substitution of *picis* forms an important part of the demand for *doits* until the mid-eighteenth century. Thereafter, any increase in the number of *doits* per capita is likely to have resulted in an increase in the deep monetisation. Moreover, the imports of *double stivers* and the smuggled *kepengs* were also contributory to the deep monetisation, but are not fully taken into account for the calculations of the monetisation here. Even though substitution for bartered transactions may have been present, this was probably limited because Java's economy was already monetised to a certain extent. For now we assume that this part of the monetisation at least compensated for the decrease in barter transactions, although this still may be a too conservative representation of Java's monetisation.

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<sup>75</sup> Christie, "Money and Its Uses"; Blussé, *Strange Company*, 38–48.

## 5. The impact of the *doit*: inflation

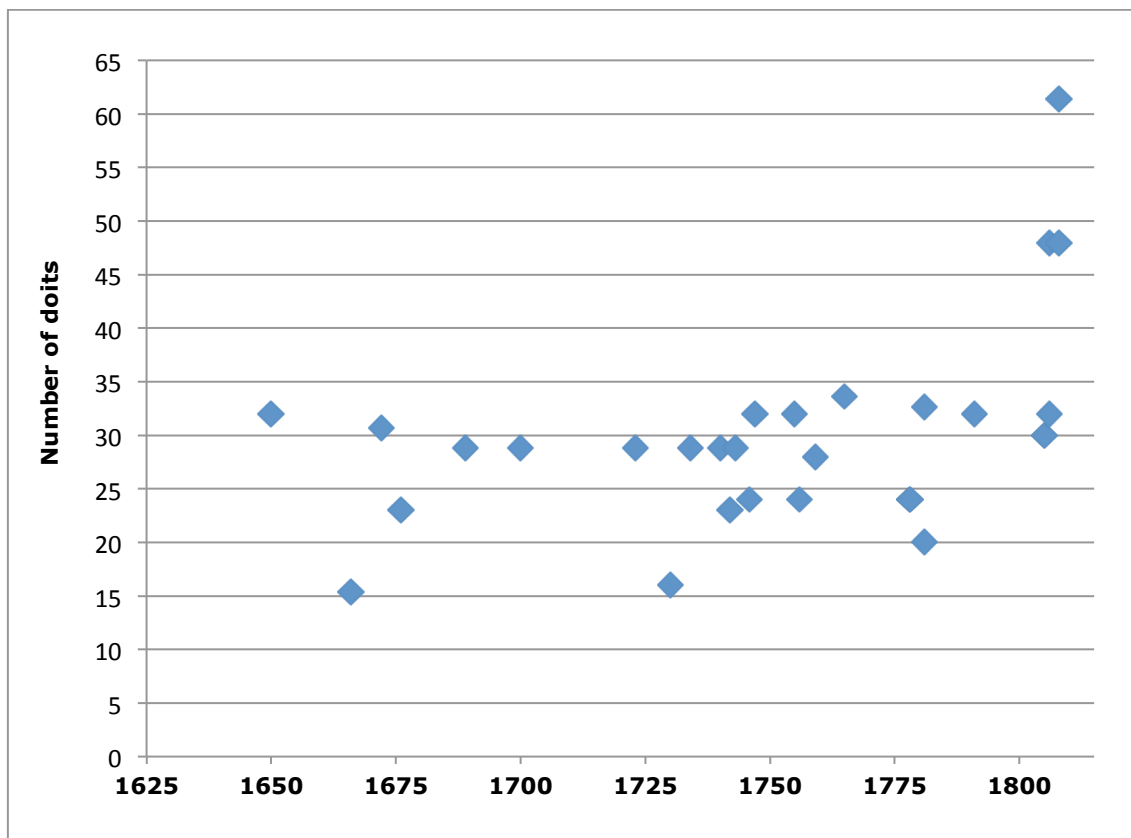
Since we may reasonably assume that the level of deep monetisation in Java increased, the question is now whether this increase can be explained by inflation. If prices rose during the eighteenth century, every transaction simply would have required more coins, while nothing really changed. The equation of exchange demonstrates this effect more formally in the formula  $MV=PT$ . This equation describes the relationship between, on the one hand, the total money supply (M) and the velocity of money (V) and on the other hand the prices (P) and trade (T). The equation demonstrates that an increase in the total amount of money leads to either a decrease in the velocity of money, or to an increase in the product PT. Since the velocity of money is, as is common in economics, assumed stable for this period, an increase of the total money supply leads to either an increase of prices (P), or the trade volume, the number of transactions (T).

An increase in the general price level is more apparent and can be determined with higher levels of certainty than an increase of the transaction volume, since no sources are available for the latter. The analysis of the inflation is based on the trends in rice prices and daily wages for unskilled labourers. Since these are two relatively one-dimensional parameters, the price level depends less on other factors, such as skills, which means that these prices enable comparisons over longer periods of time.

Wages show no structural increases over the period 1650-1808. Despite fluctuations, there was no clear upward or downward trend, although the nominal wages rose dramatically at the beginning of the nineteenth century. Until 1800 however, the average wage for a labourer was approximately 27 *doits* per day, while this never rose above the level of 34 *doits* and hardly ever paid less than 20 *doits*.<sup>76</sup>

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<sup>76</sup> Boomgaard, "Why Work," 44; Chijs, *Plakaatboek*, 1886, 2: 1642-1677:410-411; *Generale Missiven van Gouverneurs-generaal En Raden Aan Heren XVII Der Verenigde Oostindische Compagnie*, 1968, III 1655-1674:823; *Generale Missiven van Gouverneurs-generaal En Raden Aan Heren XVII Der Verenigde Oostindische Compagnie*, 1971, IV 1675-1685:97; *Generale Missiven van Gouverneurs-generaal En Raden Aan Heren XVII Der Verenigde Oostindische Compagnie*, 1975, V 1686-1697:341; *Generale Missiven van Gouverneurs-generaal En Raden Aan Heren XVII Der Verenigde Oostindische Compagnie*, 1976, VI 1698-1713:141; *Generale Missiven van Gouverneurs-generaal En Raden Aan Heren XVII Der Verenigde Oostindische Compagnie*, 1979, VII 1713-1725:647; Nagtegaal, *Hollandse Tijger*, 194; Goor, *General Missiven*, IX 1729-1737:603; *Generale Missiven van Gouverneurs-generaal En Raden Aan Heren XVII Der Verenigde Oostindische Compagnie*, 2004, X 1737-1743:492, 795, 1024; Chijs, *Plakaatboek*, 1888, 5: 1743-1750:379-381, 491; Chijs, *Plakaatboek*, 1890, 7: 1755-1764:13-92; *Generale Missiven van Gouverneurs-generaal En Raden Aan Heren XVII Der Verenigde Oostindische Compagnie*, 2007, XIII 1756-1761:100, 346; Chijs, *Plakaatboek*, 1891, 8: 1765-1775:68; Chijs, *Plakaatboek*, 1892, 10: 1776-1787:335-336, 502-503, 529, 551-553; Hooyman, "Verhandeling over Den Tegenwoordigen Staat van Den Landbouw," 213-216; Chijs, *Plakaatboek*, 1893, 11: 1788-1794:304-305; Chijs, *Plakaatboek*, 1895, 14: 1804-1808:229, 331, 556, 595; Niel, *Java's Northeast Coast 1740-1840*, 91.

**Figure 10: Daily wage levels, 1650-1808**

Source: note 76

**Figure 11: Rice prices per kati, 1650-1806**

Source: note 77.

Rice prices also fluctuated while there was no structural increase or decrease in the price level over the long run.<sup>77</sup> Even though these prices are too scattered to serve as incontestable proof for the absence of inflation, they nevertheless are indicative for a general trend. On average a daily portion of rice cost 3 to 4 *doits* per day, which means that a wage labourer spent about 1/8 of his wage on his daily meal.<sup>78</sup> Despite large short-term fluctuations in wages and prices, there is no discernible structural inflation visible between 1650 and 1800.

Probably the *doits* were indeed used to pay wages and pay for daily necessities, because they were most convenient for both, compared to the alternative currencies: the *double stiver* and the *pici*. The *double stiver* was too large, because for a daily amount of rice 0.4 *double stiver* was needed. The *pici*, on the other hand was too small, although a daily amount of rice could be easily paid with 20 *picis*, paying a daily wage required no less than 162.5 *picis*, which was impractical of course. For the nineteenth century Van Zanden has demonstrated that the *doit* was indeed the most common currency for wage payments.<sup>79</sup> Also, in the early nineteenth century, the *doit* was the popular means for the payment of wage labour. This becomes apparent from the wage increase of coolies in 1806, whereby it was explicitly stipulated that the daily wage had to be paid in copper money.<sup>80</sup> Furthermore, the fee increase of the pharmacist in Batavia in 1744 – from six to eight *doits* per patient – was expressed in *doits*, even as the remuneration for Batavia's bakers in 1740, who received 6.93 *doits* per person per day.<sup>81</sup> Finally, from 1733 onwards, the High Government sent *doits* from Batavia to Banten for the purchase of food on the local market, for the garrison there.<sup>82</sup> These examples suggest that wage payments were already linked to the presence of the *doit* almost immediately after their introduction.

The initial overview shows a relative constant level of rice prices and wages between 1650 and 1800, which not only indicates the absence of inflation, but also implies that real wages remained relatively stable. This contradicts Boomgaard's hypothesis that argued that declining real wages in this period was caused by an increasing number of wage labourers.<sup>83</sup> Although the number of wage labourers might indeed have increased, this cannot be derived from a downward trend in real wages. However, the *doits* were perfectly fit and used for paying wages and the subsequent spending thereof, which suggest that there is a linkage between wages and currency, as Lucassen proposes.<sup>84</sup>

## 6. Deep monetisation, wage labour and Great Divergence

Pomeranz' use of the distinction between core regions and peripheries is useful for understanding Java's eighteenth-century economic development. Whereas his main argument concentrates on shared characteristics of core regions in Europe and Asia until about 1750, different developments

<sup>77</sup> Boomgaard, "Why Work," 44; *Generale Missiven van Gouverneurs-generaal En Raden Aan Heren XVII Der Verenigde Oostindische Compagnie*, 1968, III 1655–1674:206; Chijs, *Plakaatboek*, 1888, 5: 1743–1750:486–492; Chijs, *Plakaatboek*, 1889, 6: 1750–1754:664, 677; Chijs, *Plakaatboek*, 1890, 7: 1755–1764:221; Chijs, *Plakaatboek*, 1892, 10: 1776–1787:366; Chijs, *Plakaatboek*, 1893, 11: 1788–1794:23; Chijs, *Plakaatboek*, 1895, 14: 1804–1808:6, 182–183, 228–229.

<sup>78</sup> Kooijmans and Oosterling, *VOC-glossarium*, 60, 91: 1 kati = 1/100 pikol, 1 pikol = 125 pond.

<sup>79</sup> Zanden, "Linking Two Debates," 191.

<sup>80</sup> Chijs, *Plakaatboek*, 1895, 14: 1804–1808:331.

<sup>81</sup> Chijs, *Plakaatboek*, 1888, 5: 1743–1750:162; Chijs, *Plakaatboek*, 1887, 4: 1709–1743:504.

<sup>82</sup> Talens, *Een Feodale Samenleving in Koloniaal Vaarwater*, 231.

<sup>83</sup> Boomgaard, "Why Work," 47; Boomgaard, "Labour, Land, and Capital Markets," 62.

<sup>84</sup> Lucassen, *Wages and Currency*.

in their peripheries proved vital for the subsequent economic divergence of the core regions.<sup>85</sup> Contrary to the Asian peripheries, where strong population growth drew people into a monetised economy by import substitution, proto-industrialisation and declining exports of land-intensive products, such as food and timber, unfree labour limited similar developments in Eastern European peripheries.<sup>86</sup> Moreover, Europe's overseas colonies in the Americas used slave labour to increasingly supply the Old Continent with land-intensive products, which prevented the latter from overstepping the land constraint.<sup>87</sup> Hence, control over labour in the peripheries is an essential element for the economic development of these peripheries and their cores.

However, Java was neither a direct periphery to China's or Japan's core regions nor a formal European colony; despite the VOC's large military influence, the company could not control the deployment of the labour force, as happened in Eastern Europe and the Americas where bonded labour and slavery dominated. Instead bonded labour and slavery declined while free wage labour was probably on the rise in eighteenth-century Java.<sup>88</sup> From around 1670 the Dutch sources began to mention the so-called *coolies*, an ambiguous term for bonded and free wage labourers, who formed a social underclass of unskilled labourers and were associated with dacoity. Depending on the circumstances these *coolies* worked for wages or turned to banditry. In either case they were outside the realm of subsistence farming and formed a permanent pool of wage-labour. Additionally, temporary labour migrants start appearing in the sources from around 1750. These so-called *bujangs*, worked as free wage labourers either for a few years to earn money before getting married or in the agricultural low season.<sup>89</sup> Moreover, work for the state was increasingly being paid for in cash and statute labour was gradually replaced by monetised taxation, which stimulated both wage labour and Java's deep monetisation.<sup>90</sup>

Java's eighteenth-century developments seem to resemble other Asian peripheries closer than that of the European ones, since it experienced population growth, the economy monetised and wage labour gained importance. We examined population growth and monetisation extensively, which raises the question to what extent wage labour increased. If the *doits* were solely used for wage payment and the subsequent spending, this implies an equal distribution between both. This means that wage labour increased with half of the degree of the deep monetisation of 1.33 per cent per year, which results in an estimated yearly growth of the wage labour of 0.67 per cent. Even though economic growth cannot directly be proven, the increase in wage labour may serve as proxy for the ejection of labour from self-subsisting agriculture during the second half of the eighteenth century.

Probably the production outside subsistence farming increased and it is likely that wage labour was an essential part thereof, but wage labour had not yet reached a critical mass to lower real wage levels, as Boomgaard suggested. Instead, references to labour scarcity reappear regularly until the early nineteenth century.<sup>91</sup> This might have happened during the first decades of the nineteenth century, since Van Zanden's estimates of a daily wage of 18 *doits* in 1820, which

<sup>85</sup> Pomeranz, *The Great Divergence*, 254.

<sup>86</sup> Ibid., 253–255.

<sup>87</sup> Ibid., 264–269.

<sup>88</sup> Boomgaard, "Labour, Land, and Capital Markets," 62–63.

<sup>89</sup> Boomgaard, "Why Work," 43–46.

<sup>90</sup> Kwee, *The Political Economy of Java's Northeast Coast, c. 1740-1800*, 117; Boomgaard, "Labour, Land, and Capital Markets," 62–63.

<sup>91</sup> Chijs, *Plakaatboek*, 1895, 14: 1804–1808:566; Boomgaard, "Why Work," 47–48.

is 30 per cent lower than the average of 27 *doits* during the seventeenth and eighteenth centuries, which suggests that the labour market had changed significantly by then.<sup>92</sup>

## 7. Conclusion

Java's economy was deeply monetised around 1800, to which the large imports of copper *doits* by the VOC had contributed considerably. These tremendous imports of VOC-*doits* provided Java's residents with a reliable coin, which could store value and which at the same time eased their daily transactions. In the course of the eighteenth century the *doit* was increasingly used for small payments, such as daily wages and subsequent spending thereof, while the wear rate was low enough to sustain an increase of the *doits* in circulation, both in total amount as well as per capita. Yet this huge influx of coins did not lead to inflation, which means that the transaction volume increased. The subsequent penetration of money usage at the deepest level of Java's economy indicates a shift away from subsistence farming, which suggests economic growth during the second half of the eighteenth century.

Until about 1750 the *doits* substituted the Asian *pici*-coins, which means that no reliable conclusions can be drawn about the deep monetisation before the mid-eighteenth century on the basis of the *doits* per capita. Once the market became saturated with small coins during the 1740s, the *picis* were no longer in demand. Thereafter, the *picis* disappeared from circulation and any increase in the *doits* supply resulted in increased deep monetisation, which suggests that the number of people depending on the market to buy their daily necessities increased similarly.

This increasing importance of retail transactions began perhaps prior to the mid-eighteenth century, but this remains to be researched. Nevertheless, the increase of 66 per cent in the number of *doits* per capita, supplemented with significant imports of *double stivers*, indicates an increased transaction volume using small coins between 1755 and 1800.

The greater reliance on the market could well have been the result of an increased number of wage labourers – although growing proto-industrial production or factors related to an "industrious revolution" might also explain the relative diminishing importance of subsistence farming. To what extent a growing number of wage labourers or proto-industry contributed to the increased demand of small coins per capita during eighteenth century cannot be established with a satisfactory level of certainty. Whatever the precise causes were, Java prospered economically and demographically between 1750 and 1800. This contradicts prevailing historiographical suggestions on Java's monetary and economic development, which picture Java around 1800 as rather backward, with few incentives for market production, low levels of commercialisation, self-subsisting farming and a very small money supply.<sup>93</sup>

The increase of the small coin supply outpaced the population growth, while subsisting farming ejected labourers, who increasingly depended on the market for their daily necessities and used *doits* as payment for that. Moreover, these economic developments on Java show close resemblances with the economic growth in other Asia peripheries, which also experienced increasing monetisation, population growth and reliance on free wage labour. On the other hand, bonded labour in Europe's peripheries allowed England to overcome the land constraint and

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<sup>92</sup> Zanden, "Rich and Poor before the Industrial Revolution," 13.

<sup>93</sup> Zanden, "Linking Two Debates," 171; Pomeranz, *The Great Divergence*, 267.



industrialise, whereas Asia's cores went on the path of labour intensification. Hence, research into the Javanese labour market can provide essential clues for and contribute to the role of peripheries during the Great Divergence.

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