Revisiting the de-industrialization thesis. Gender and indigenous textile production in Java under Dutch colonial rule, ca. 1830-1940*

Elise van Nederveen Meerkerk

Wageningen University

elise.vannederveenmeerkerk@wur.nl

Submitted to: EHR (currently under 2nd revision). Please do not quote

I

In the grand historical explanations for global economic inequality, the process of industrialization plays a pivotal role. Although there is an ongoing discussion about the timing of the 'Great Divergence' between 'the West' and 'the rest',[1] there is widespread agreement that the beginning of the nineteenth century marked a significant *widening* of the global income gap due to the onset and spread of the 'Industrial Revolution'. Western economies enhanced their labour productivity by the mechanization and rationalization of production, inducing unprecedented levels of economic growth.[2] At the same time, many countries in the non-Western world experienced de-industrialization, which can be defined as a declining share of manufacturing in output and employment.[3]

The links between industrialization, development and colonialism have been subject to heated academic debate. In the decades after the Second World War, both neo-classical economists and dependency theorists considered large-scale industrialization as *the* pathway towards development for decolonizing countries, albeit based on contrasting ideologies. From a modernist point of view, the 'Industrial Revolution' in the West set the

* The author wishes to thank Pierre van der Eng and Jeff Williamson for their generous sharing of datasets compiled by them. Moreover, many thanks to the editors and three anonymous referees of the *Economic History Review*, as well as Ewout Frankema, Pierre van der Eng, Kate Frederick, Corinne Boter and Michiel de Haas for their comments to an earlier version of this paper.

[1] Pomeranz, *Great Divergence*; Parthasarathi, 'Rethinking wages'; Broadberry and Gupta, 'Early Modern Great Divergence'; Allen e.a., 'Wages, prices'.

[2] See e.g. Mokyr, *The British Industrial Revolution*.

[3] Pike, 'De-industrialization', 51. Note that there is a difference between absolute and relative declines in output and employment. A growing economy may thus 'de-industrialize' in relative terms, whereas in absolute terms, the manufacturing sector is still growing in output value and/or employment.

example for post-independence developing countries.[4] Most neoclassical authors ascribed their 'backwardness' to endogenous factors, such as the 'primitive conditions' of indigenous economies,[5] or the lack of dynamism among indigenous elites.[6] Neo-Marxist economists and historians – most notably World-Systems theorists and other proponents of the 'dependency school' – instead blamed the former imperialist powers for the underdevelopment of the Third World. Their main idea was that colonial extraction enforced a worldwide division of labour that impoverished countries in the periphery by destroying local manufacturing industries or actively preventing their development. Colonialism deepened existing patterns of economic specialization, in which 'core' industrialized countries, with their increasing demand for cheap raw materials and tropical goods, exchanged – on unequal terms – manufactures for primary commodities produced in the 'periphery'.[7]

In the early 1980s, such unilinear views on de-industrialization came under attack from two historiographical strands. On the one hand, scholars investigating 'industry before industry' (usually referred to as: proto-industry) in Europe discovered that industrialization was far from a unidirectional process: entire regions in Europe de-industrialized or, 're-agrarianized', at the onset of the nineteenth century. They also showed that in European industrialized areas, factory production and cottage manufacturing coincided until at least the late nineteenth century.[8] On the other hand, social and economic historians of the Global South, most notably India, empirically demonstrated that the image of de-industrialization has been, at best, incomplete. For instance, many handloom-weaving regions in India were able to compete with Western factory-made cloth until the first decades of the twentieth century.[9] More recently, the term 'labour-intensive industrialization' has been coined to refute Eurocentric conceptions of the global diffusion of western manufacturing technologies and practices, particularly in reference to Asian economic development.[10]

---

[4] E.g. Rostow, *Stages of Economic Growth*, p.139; Landes, *Unbound Prometheus*.
[5] Bauer, *Dissent on Development*, 148.
[6] Kerr e.a., *Industrialism*.
[7] E.g. Frank, 'Development of underdevelopment'; Rodney, *How Europe underdeveloped Africa*; Wallerstein, *Second Era of Great Expansion*.
[8] Kriedte, Medick and Schlumbohm, *Industrialisation before industrialisation*; Johnson, 'De-industrialization and globalization', pp.7-8.
[9] Chandavarkar, 'Industrialization in India'; Roy, *Artisans and industrialization*; Parthasarathi, 'Rethinking wages'.
[10] Austin and Sugihara, 'Introduction'; and Sugihara, 'Labour-intensive industrialization'.

The de-industrialization debate seemed to have been quieted for some time, but Jeffrey Williamson has recently reinvigorated it with his book *Trade and Poverty*. Williamson proposes that due to falling trade costs in the nineteenth century, global market integration accelerated. This entailed a deepening of existing patterns of specialization, in which the 'poor periphery' focused on the export of primary products and raw materials to fuel the growing demands of manufacturing enterprises and consumers in the 'core'. Simultaneously, industrializing countries began specializing in the export of manufactures alongside trade and business services.[11] Market forces formed the dominant mechanism behind this global division of labour. Growing demand for primary commodities drove up their world market prices, while rapid efficiency gains and competition in manufacturing production in the core depressed prices for industrial products, leading to a 'terms-of-trade-boom' in the poor periphery offering a dual incentive for de-industrialization.

At first sight, Williamson's theoretical reasoning makes much sense. Indeed, the transport revolution in the nineteenth century lowered transportation costs to such a degree that goods could be traded relatively cheaply on a large scale, thus facilitating worldwide specialization. In principle, such specialization favoured trade and economic growth in both manufacture-exporting countries and tropical commodity-exporting countries, but in practice, per capita GDP growth was faster in the nineteenth-century 'core' than in the 'periphery'.[12] The growing income gap was compounded by two additional mechanisms: 1) labour productivity gains in manufacturing sectors were higher as a result of capital investments and technological innovation; 2) price volatility was greater for agricultural commodities than for manufactured goods, making countries in the 'periphery' much more vulnerable to world market shocks.[13]

Nevertheless, Williamson's core assumptions, which are based on Ricardian trade theory, contain some fundamental problems which deserve closer scrutiny. First of all, it presumes that labour can be costlessly reallocated between industries and sectors within a country, and that labour is always fully employed. Second, Ricardian models assume that traded goods are homogeneous (i.e. identical) across firms and countries, and that they are perfectly competitive in countries trading with each other. And finally, *international* trade is taken to be the main driver of economic growth.

[11] Williamson, *Trade and poverty*.
[12] *Ibid.*, p.5; Williamson, 'Globalization', 356-7.
[13] Williamson, 'Globalization'; Williamson, *Trade and poverty*, p.27.

This article offers a theoretical and empirical critique on Williamson's de-industrialization thesis by systematically testing these three assumptions for colonial Indonesia. This represents an ideal case study because it fits Williamon's conception of a poor peripheral region unusually well, as I will explain in the next section. I explore the impact of Dutch colonial policies and trade in the process of industrial development in colonial Indonesia, focusing particularly on the textile industry in Java, the most populous part of the archipelago, which had the most intensive contact with Europeans from the early modern period.[14] My argument is that many of the theoretical assumptions underlying Williamson's thesis fail to hold for colonial Java and that empirical observations suggest that its indigenous textile industry was far more resilient than many contemporaries and historians have contended.[15]

First, I argue that the full employment and labour substitutability conditions of Ricardian trade theory are problematic. Units of household labour were not interchangeable between sectors without costs, due to economic, social and cultural realities in Java. Moreover, different household members faced different opportunity costs. Disregarding the heterogeneity of household labour, particularly the allocation decisions relating to female labour, prohibits a clear view of production in Java. Indeed, existing textile industries may actually have been resilient and responsive to both colonial policies and external global price shocks. It is true that Dutch factories were able to produce more efficiently in terms of capital intensity and mechanization, but a close–to-zero opportunity cost for Javanese female labour in certain periods of the year continued to offer a firm basis for a labour-intensive path of industrialization. I will show, for instance, that while cotton hand-spinning was almost eradicated by 1900, local women's handloom-weaving remained a vibrant industry until at least the First World War.

Second, I argue that, like units of labour, different textile goods were not perfect substitutes. Specific local traditions of cloth production persisted because they were still strongly demanded by growing numbers of indigenous consumers. Whereas these products

[14] Until the end of the nineteenth century, Dutch domination in the East Indies confined itself mostly to the island of Java. Most literature as well as archival sources deal with Javanese history. It is common among historians to interchange 'Java', 'the Netherlands Indies' or 'colonial Indonesia', and I choose to do so accordingly.

[15] E.g. Lindblad, 'Handel in katoentjes'; Dick, 'Nineteenth-century industrialization', 134; van Zanden and Marks, *Economic history*, pp.92-3. A notable exception is Van der Eng, 'Why didn't colonial Indonesia'. Van der Eng acknowledges that the value added in cotton textile production (most notably finishing imported cloth) increased during most of the colonial period.

may have been more expensive than many imported goods, they were also of higher quality. In fact, the imported items of Western textile goods appear to have been to a large extent semi-finished goods (yarns and white cloth), which were subsequently processed by indigenous producers.[16] Because quality and taste mattered, the assumption of perfect competition makes little sense in the historical context of Dutch imperial trade relations. Furthermore, as in India,[17] new techniques were introduced in colonial-era Indonesia to cope with cheaper European printed cloth, which enabled local producers to regain at least part of the indigenous market for coloured cotton textiles for a considerable time. Indonesian producers specialized in particular niches, such as *cap batik* and *sarong* weaving. Consequently, textile production may have taken different forms, but could still compete with imported cottons.The result of these indigenous responses was that de-industrialization never occurred to the extent predicted by neo-classical trade theory or suggested by dependency theorists.

Third, I argue that it was not so much *international* trade that constituted the resilience of indigenous textile production, but rather the growth of *internal* markets. In the nineteenth century, colonial Indonesia, and Java in particular, experienced significant population growth as well as monetization of the economy and infrastructural development. Combined, these factors facilitated regional specialization of indigenous textile production – most notably in West and Central Java – which was geared towards indigenous tastes in cloth. As has been noted for India and Africa,[18] Indonesian consumers were for quite some time reluctant to buy European textiles, preferring local creations. Since Williamson's terms-of-trade argument is mainly based on evidence of relative prices of internationally traded goods, this obscures opportunities of production for growing internal markets. However, more than external trade relations, internal factors such as demographic and socioeconomic developments may be the key to explaining the high degree of variability in economic development paths in the nineteenth-century periphery.[19]

This article proceeds as follows. The next section will further motivate the suitability of the case of the textile industry in colonial Indonesia to test the de-industrialization thesis. Sections III through V will provide an in-depth exploration of the three assumptions

[16] Segers, *Manufacturing industry 1870-1942*, p.153.
[17] Roy, 'Labour intensity and industrialisation'.
[18] Haynes, *Small town capitalism*, p.13; Austin, 'Resources, techniques, and strategies', p.602.
[19] See e.g. Kravis, 'Trade', 858-9.

addressed in this introduction. Section VI concludes with an analysis of the validity of the de-industrialization thesis for colonial Indonesia.

II

The case of indigenous textile production in nineteenth-century Java is worth exploring for three main reasons. First, colonial Indonesia seems to perfectly match Williamson's conception of a peripheral economy that specialized into primary commodity exports, with an increasing dependence on manufacturing imports. Indeed, Dutch colonial economic policies during most of the nineteenth century were directed towards simultaneously stimulating the cultivation of export crops and the extraction of raw materials, and towards finding new consumer markets for the emerging metropolitan textile industry. As I will now briefly elucidate, colonial authorities followed the dual strategy of forced cultivation on the one hand, and the implementation of import duties on non-Dutch textiles on the other.

In 1824, the Dutch Trading Company (*Nederlandsche Handel-Maatschappij*, hereafter *NHM*) was established, which concentrated on trade with Dutch overseas possessions, most notably the East-Indies. The aim of the *NHM* was to promote national economic interests, particularly by stimulating national industry and international trade.[20] Although the *NHM* was not granted a full monopoly, it did receive trading preferences for Dutch goods and ships sailing under the Dutch flag, mostly in the form of favourable import tariffs compared to other nations. Further, the *NHM* obtained the exclusive right to handle all government shipping to and from the colonies.[21]

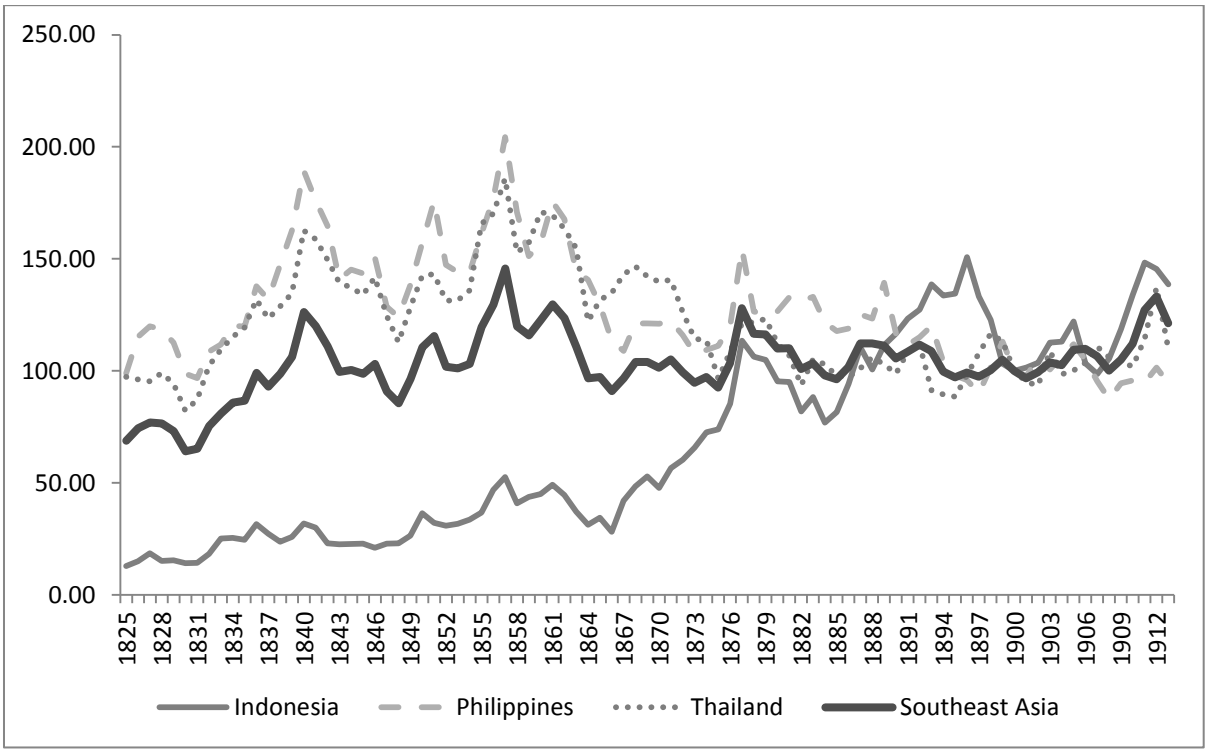
Besides imports, the *NHM* was instrumental in the shipping of increasing quantities of Javanese exports. In 1830, the colonial government implemented the Cultivation System (CS) on the island. Under the CS (ca. 1830-1870) Javanese peasants were forced to cultivate a percentage[22] of their land for cash crops such as coffee, sugar and tea, for which they received – a modest – monetary recompense, called *plantloon* (cultivation wage). This coercive system of cultivation was most stringent in the period 1830-1850 and led to an

[20] De Graaf, *Voor handel en maatschappij*, pp.39-41.
[21] Van Zanden and Van Riel, *Strictures of inheritance*, p.112.
[22] It varied over space and time – some historians report an overall average of 20%, others note variations from 6% in 1830 up to 75% in some regions in the 1840s. Elson, *Village Java*; Boomgaard, 'Female labour', p.8.

intensification of labour and increasing monetization of the Javanese economy in the first half of the nineteenth century.[23]

A second factor that makes Java an ideal case study is that, compared to the rest of Southeast Asia, Williamson's data show the most spectacular terms-of-trade increase for colonial Indonesia. Between 1825 and 1857, its net barter terms of trade quadrupled, whereas in the same period they only doubled in the Philippines (see Figure 1). Moreover, the steepest rise in the terms of trade of colonial Indonesia occurred between the 1860s and 1896 when the upward trend tapered off in Southeast Asia as a whole. Between 1825 and 1896, the compound annual growth rate of the net barter terms of trade of Indonesia constituted no less than 3.5%! Williamson therefore concludes that 'globalization must have done bigger damage to industry in Indonesia than almost anywhere else in the non-European periphery'.[24]

Figure 1 – Index of net barter terms of trade in Southeast Asia, 1825-1913 (1900-100)



Source: Jeffrey G. Williamson, Terms of Trade database.

[23] For more on the Cultivation System see Fasseur, *Kultuurstelsel*; Elson, *Village Java*.
[24] Williamson, *Trade and poverty*, p.42.

Williamson is not alone in this assessment. In fact, many historians have contended that the influx of Dutch textiles in the nineteenth century ruined indigenous textile production in Java, and thus contributed to de-industrialization and declining living standards.[25] However, while European imports unquestionably affected indigenous markets for both Javanese producers and consumers of cotton textiles, I will argue that the story is far more complicated than outright decline, especially when we take into account labour-intensive domestic industry, which was mainly performed (part-time) by women.

Here, we arrive at the third rationale for the selection of this case study, and, more specifically, for the focus on the Indonesian *textile industry*. In colonial Indonesia, a number of industries developed towards the end of the nineteenth century, including mechanized sugar refining and mineral (petroleum) extraction, all of which help to refute Williamson's claim that Indonesia was more affected than other countries in the periphery.[26] Why, then, is it worthwhile to study de-industrialization in the textile industry?

First of all, in the context of an emerging literature on 'labour-intensive industrialization' in Asia[27] it makes perfect sense to focus on indigenous (non-mechanized, labour-intensive) textile production. Textile production has had a long history in the Indonesian archipelago, where cotton textiles were almost exclusively produced by women.[28] Cloth-making was primarily associated with the 'life-giving properties of females', who metaphorically spun and wove the 'thread of life'.[29] This differed from India, where cotton spinning was women's work, but weaving was predominantly executed and controlled by men. Furthermore, as far back as the tenth century, elite women practiced *batik*, a traditional labour-intensive Indonesian craft of waxprinting cotton cloth with artistic patterns.[30] Importantly, women usually did not use the coarser locally woven cloth for the *batik* process, but relied on softer imported fabrics from India with a higher thread density that made them very suitable for treatment with beeswax.[31] If we want to study de-

[25] Boomgaard, 'Female labour'; Lindblad, 'Handel in katoentjes'; van Zanden and Marks, *Economic history*, pp.92-3.
[26] Dick, 'Nineteenth-century industrialization', 123. In fact, Dick even typifies Java's sugar industry in the last decades of the nineteenth century as the most advanced in Asia.
[27] See the excellent edited volume by Austin and Sugihara (eds), *Labour-intensive industrialization*.
[28] Hall, 'Textile industry in Southeast Asia', p.101.
[29] Watson Andaya, 'Cloth trade', pp.30-1.
[30] Jasper and Mas Pirngadie, *Batikkunst*, p.3.
[31] Clarence-Smith, 'Production of cotton textiles', p.130.

industrialization, it is best to investigate a longstanding industry, which was already part of international trade relations *before* the colonial era.

Secondly, Williamson himself generally uses textile production as a proxy for (de-) industrialization, because it was a globally ubiquitous handicraft sector. Supposedly, it and was also the first to be outcompeted when mechanization in Europe and North-America introduced cheaper, factory-made variants into local markets. Williamson reasons that for countries in the periphery, it became more rewarding to allocate labour to agricultural export products.[32] However, as I will argue in detail in the next section, this line of reasoning does not take into account the relative invisibility of traditional women's work in textile production, whose activities were often excluded from the historical (colonial) sources. This neglects the fact that household members were engaged in a wider range of labour relations that created a degree of flexibility in textile production for domestic as well as commercial purposes. Indeed, the effects of trade policies and price shocks on gendered labour relations in Java have hitherto hardly been studied.[33]

Thirdly, in terms of employment, the textile industry was the largest branch of industry throughout the colonial period in terms of employment. Although data are scarce, the generally reliable 1930 census reports that almost 30% of the registered Javanese industrial labour force worked in textiles, the great majority of them being women.[34] As we will find out below, the late 1920s was not the heyday of indigenous textile production, which implies that the relative importance of the domestic textile industry has probably been even larger before. To scrutinize the first assumption of Ricardian trade theory, i.e. the full employment and substitutability of labour, I will proceed to explore the quantitative and qualitative development of the textile labour force in colonial Indonesia.

III

Before the Cultivation System, Javanese men and women mostly worked in subsistence agriculture, with rice growing on dry (*tegal*) lands and garden agriculture mostly performed

[32] Williamson, *Trade and poverty*, most notably pp.53-7.
[33] An exception is Boomgaard, 'Female labour', but his article focuses more on the demographic than the socioeconomic aspects, let alone the labour relations involved.
[34] CBS, *Volkstelling 1930,* pp.94-5.

by women, while both men and women were required for wetland (*sawah*) rice cultivation.[35] Women, sometimes assisted by children, were responsible for the labour-intensive transplanting of young rice seedlings onto the *sawahs*, while men were in charge of the maturing of the crop over the following three months, performing tasks like tilling and water control. Harvesting was a community task done by all family members.[36] Regional market exchange traditionally existed in large parts of Java, and part of this agricultural produce, as well as processed food, was traded for money or goods. Women dominated local markets and often ran *warungs* (small shops).[37] Spinning and weaving formed another important economic activity for women, who produced for both their own household and regional markets. Around 1820, colonial officials reported tens of thousands of women working as textile producers. In some areas, such as Surabaya, Gresik and Besuki, about 50% of all households owned a spinning wheel and/or a loom at the beginning of the nineteenth century. It is unclear how much of this activity was market production, but its contribution must have been substantial, ranging from small pocket money to more than a household's agriculture-based income.[38]

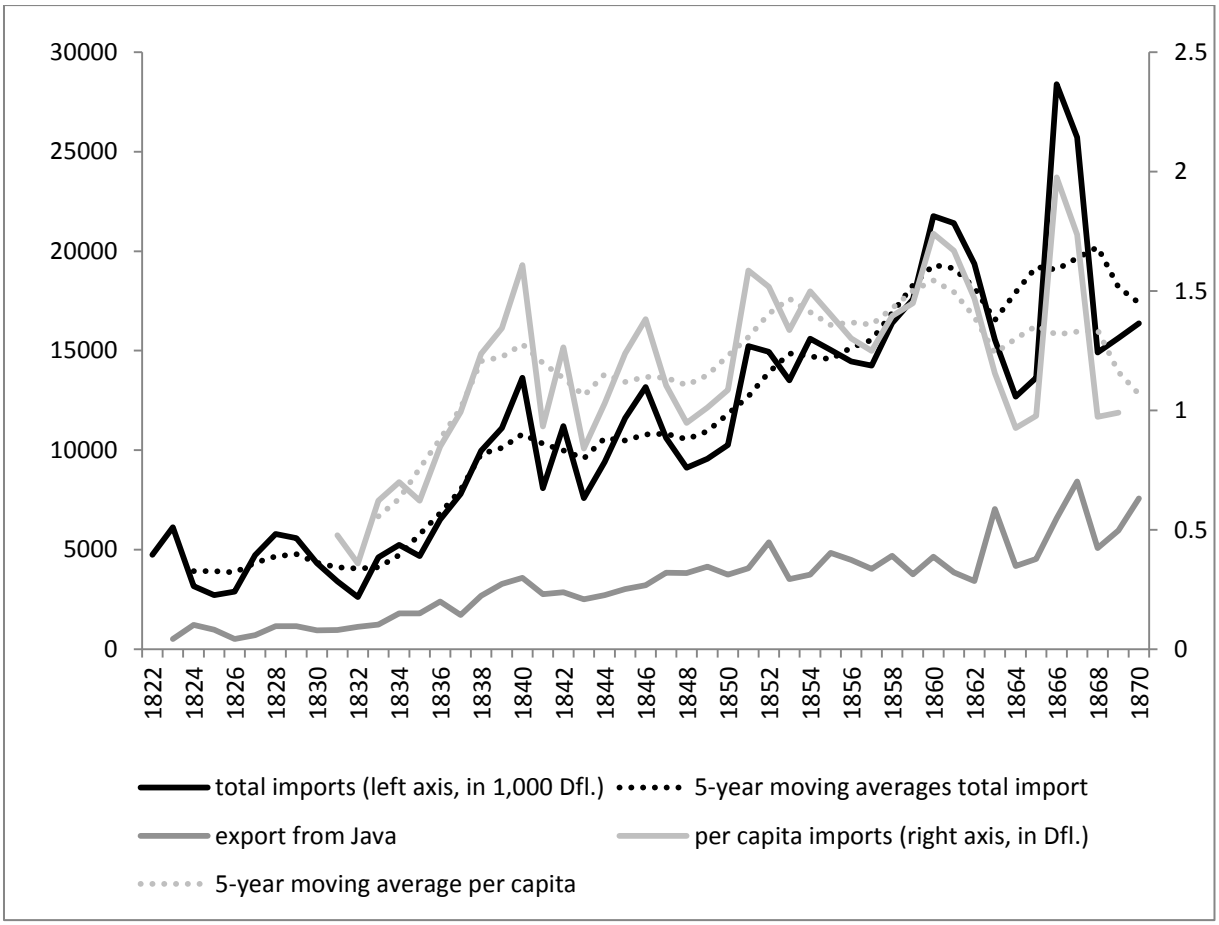
After the introduction of the Cultivation System, Javanese women supposedly had less time to produce their own textiles, because they had to devote more time to (subsistence) agricultural activities, as more of their husbands' time became allocated to the forced cultivation of cash crops.[39] On another note, women may have found more profitable side activities than spinning and weaving, such as preparing and selling food to male CS workers on plantations.[40] Moreover, the monetization that the CS entailed provided native households with more cash and opportunities to buy imported European cotton cloth in the market. It has been argued that these three factors ruined indigenous textile production in colonial Indonesia.[41]

Unfortunately, no output figures or labour statistics on textile production are available for the early nineteenth century. Therefore, we have to rely on more indirect indicators, most notably import statistics, to grasp local demand. Figure 2 indicates that, in

[35] Stoler, 'Class structure and female autonomy', p.77.
[36] Elson, *Village Java*, p.6.
[37] Watson Andaya, *Flaming womb*, pp.121-4; Elson, *Village Java*, p.255.
[38] Boomgaard, *Children of the colonial state*, p.127, 131.
[39] Boomgaard, 'Female labour', pp.17-8.
[40] Arsip Nasional di Republik Indonesia, Jakarta (ANRI), Residential Archives Besuki, 'Statistiek van Bezoekie [1836]'; ANRI, Residential Archives Bagelen, 'Statistiek der Residentie Bagelen [1837]' .
[41] Matsuo, *Javanese cotton industry*, 8; Lindblad, 'Handel in katoentjes', pp.91-2.

current Dutch guilders, textile imports into Java indeed rose tremendously from the early 1820s onwards, which may point to de-industrialization of indigenous textile production. However, the overall rise in the total value of textile imports should be adjusted for population growth. If we look at the 5-year moving averages of *per capita* imports (grey dotted line), we see that imports per person rose quickly before circa 1840 – shortly after the establishment of the *NHM* and the implementation of the Cultivation System – but that per capita imports remained at a relatively stable level thereafter, until the early 1870s (between Dfl. 1.25 and 1.50). Furthermore, textile exports from Java followed a steady upward trend in this period, suggesting that, apart from production for home use and regional markets, indigenous weaving for export markets remained substantial.

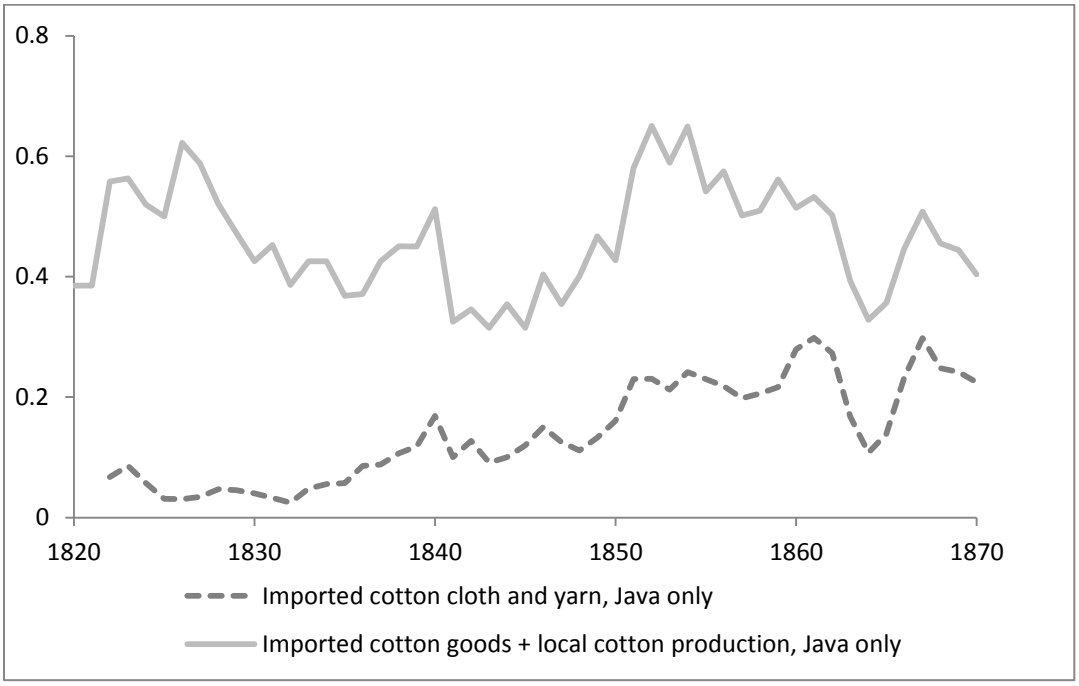
Figure 2 – Total value of imports cotton goods (cloth and yarns) to Java, as well as exports (left axis, x 1,000 Dfl.), and per capita imports (right axis, in Dfl.) 1822-1870



Sources: Korthals Altes, *General trade statistics 1822-1940*, pp. 107-112; Boomgaard and Gooszen, *Population trends 1795-1942*, pp. 105-110, 116-117, 119-121.

It is also worthwhile to look at per capita imports in *volume*, instead of total value, to obtain a better sense of the quantities of cloth imported per head of the population. Although the colonial statistics up to 1873 only list values instead of import volumes, Pierre van der Eng has recently published estimates of the latter (see Figure 3). Van der Eng also estimated local textile production by gauging local demand, which he assumed to be between 0.4 and 0.6 kilogrammes per capita in this period, roughly equalling the consumption of only 1 sarong per person per year. His estimates suggest that the share of imported cloth indeed rose until roughly 1840, but that it hardly ever exceeded more than 50% of total consumer demand.

Figure 3 – Estimated per capita imports, Java 1822-1870 (in kg)



Source: Van der Eng, 'Why Didn't Colonial Indonesia', p. 1023.

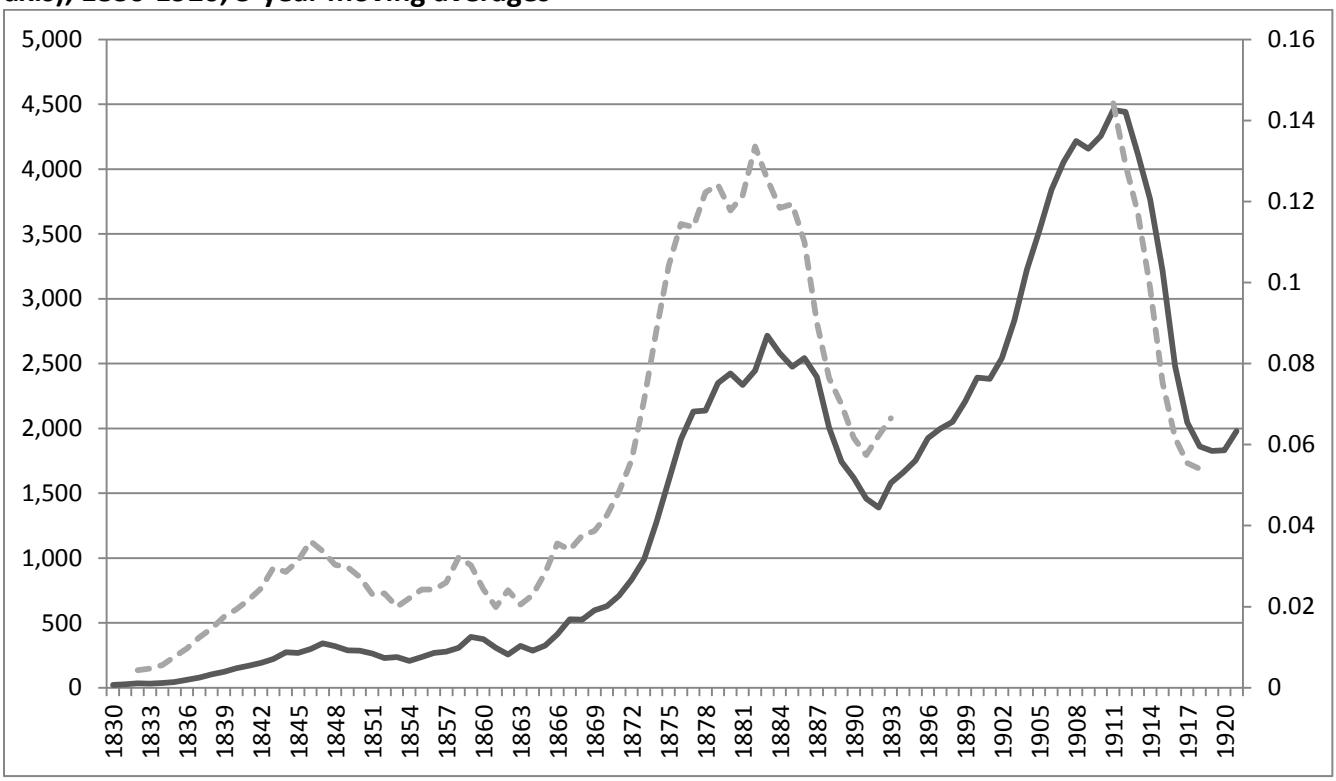
According to van der Eng's estimates, local production seems to have been quite inelastic, in the sense that the cumulative trends (imports plus local production) followed the more general patterns of the volume of *imported* textiles. However, there are reasons to believe that local textile producers responded in much more flexible ways to particular events. As Haynes has described for India, handloom weavers in this period adjusted their production swiftly to price incentives, as well as occasions of famine or drought.[42] As per capita imports

[42] Haynes, S*mall town capitalism*, p.174.

stagnated between 1840 and 1870, and exports from Java rose in this period (Figure 2), it is highly probable that Javanese weavers displayed similarly flexible responses towards colonial textile imports.

Other evidence likewise indicates that foreign cotton imports did not unilinearly lead to de-industrialization. Colonial import statistics up to 1874 do not distinguish between imported factory-made *cloth* and imported *yarns*, but additional sources and my own estimates suggest that cotton yarn imports increased considerably, both in terms of value and weight (Figure 4, see also Appendix). At least until the First World War, the declining prices of factory yarns and other semi-finished textiles in this period did not hamper, but rather stimulated indigenous weaving and cloth finishing. Imports of cotton yarns increased particularly dramatically (in both total tonnage and in kgs per capita) during two periods: first, imports increased fivefold in the 1870s and 1880s, and then again, they rose from the 1890s up to the First World War.

Figure 4 – Yarn imports to Java and Madura (x 1,000 kg) and kg per capita (secondary axis), 1830-1920, 5-year moving averages



Sources: See Appendix A.

From the fluctuations in imported yarns it may be inferred that weavers responded quite flexibly to local market prices of home-woven cloth: in periods when demand for ready-made cloth declined, indigenous women increasingly used imported factory yarns to weave themselves. This flexibility depended to a large degree on the fact that women's time was heavily divided between several household and economic duties:

> The indigenous woman in general has the great virtue, that she is diligent. Amidst her domestic cares and worries she finds some moments, to tighten the beam of the handloom and weave a couple of strips. The weeping of a child, the homecoming of the husband, the visit of a neighbour, etc. interrupts her labour. Later, however, she bravely takes her work to hand again.[43]

Local archives and more qualitative indications in the contemporary literature further underpin the idea that Javanese women started to weave on a larger scale in the decades after 1840, not only for household consumption, but also for the market. As we have seen, exports from Java – mainly to the outer islands of the Indonesian archipelago – continued to grow in this period. This was especially in some regions, such as Priangan (West Java), where thousands of women were active in weaving – sometimes with their own spun threads, but increasingly with European yarn – and traded their cloth both locally and regionally in the late 1840s and 1850s.[44] In 1862, it was stated that cotton cultivation could not revive in this residency, because the Javanese population 'rather bought [...] European yarns to weave their rugs'.[45] And in 1864, the Resident of Batavia noted that due to the high textile prices during the American Civil War, demand for imported cotton goods was low with the notable exception of cotton yarns.[46]

Thus, hand-spinning in Java slowly but surely made way for imported cotton yarns, although in some areas hand-spinning remained common until the early twentieth century, especially in East Java.[47] To what extent was this shift to the use of factory-made thread a problem for local producers, and should historians consider it as such? First of all, hand-

[43] Jasper and Mas Pirngadie, *Weefkunst*, p.6.
[44] ANRI, Residential Archives Priangan, 3/12, Algemeen Verslag (henceforth AV) 1849 and 30/4, Statistiek 1852.
[45] ANRI, Archives Director Cultures, 1621, Cultuurverslagen Preanger Regentschappen, Verslag 1862. Note the rather downplaying expression of 'rugs' instead of 'cloth'.
[46] ANRI, Residential Archives Batavia, 350/7, AV Batavia 1864, p.99.
[47] Matsuo, *Javanese cotton industry*, p.12

spinning was extremely time-consuming: the preparatory cotton ginning alone took an adult two full days to produce 1.25 pounds of ginned cotton. Consequently, ten days of female labour were required for the spinning of three *tukal* (raps) of thread.[48] Put differently: if a woman sold her spun yarns in the market, she could make only two cents net profit from two days of labour, while weaving a *slendang* (shawl) would yield her 17 cents for 10 days' labour – a 70% higher profitability.[49] Second, European spinning machines markedly advanced during this period and were able to deliver a more even and stronger product compared to a few decades earlier. Thus, apart from labour preferences, consumer preferences were also at play.

Where hand-spinning was still common, older women generally did the spinning, whereas younger women devoted themselves to more profitable weaving.[50] Even if opportunity costs of female labour were traditionally low for hand-spinning, thus enabling competition with factory-made yarns, the CS probably made (younger) women's labour time in subsistence and market agriculture more valuable than before.[51] All this implies that households rather bought imported factory yarns that women could weave into cloth either for home use or for the (local) market. Indeed, regional reports from the 1830s indicate that there were still tens of thousands of women active as cotton weavers, for instance 36,000 in Besuki in 1836, and 10,000 in Bagelen in 1837.[52]

In the 1860s, the directors of the *NHM* in Batavia became increasingly worried about stagnating demand for Dutch fabrics in Java. They raised concerns about the increasing volume of unused textiles rotting away in Batavian warehouses. Several investigations could not provide conclusive answers about the reasons for the decline: could it be the high textile prices, combined with the declining welfare of the Javanese population? Or was it perhaps due to the increased competition from local producers, as some informants seemed to suggest? Colonial officials estimated that in the period 1864-1868 cotton imports could have only accounted for roughly one-third of all Javanese textile consumption. This implies that Javanese production amounted to about 65% of the total value of textiles consumed by the

[48] *Ibid.*, p.4.
[49] *Verslag*, pp.1, 5.
[50] Jasper and Mas Pirngadie, *Weefkunst*, p.14.
[51] Elson, *Village Java*, p.277. A similar process occurred in the mid- to late-nineteenth century in India, but Haynes reports that there were fewer labour market alternatives for women, as Indian weavers were generally male. Haynes, *Small town capitalism*, 44-7.
[52] Elson, *Village Java*, p.274.

(adult) Javanese population.[53] This seems to confirm that Van der Eng's estimates of local consumption are modest and that perhaps consumption was – at least in this period – even less influenced by imports than he estimated.[54] It is telling that contemporary observers could not understand why Javanese peasants complained about their increased labour efforts due to the forced deliveries of cash crops, yet were still able to increase their textile production.[55] Clearly, they overlooked the labour input of Javanese women in weaving.

Handloom-weaving thus remained very important, even if it may have been abandoned for periods of time. In 1880, the resident of Priangan (West-Java) reported that 'the weaving of cloth is universal here, and every village woman is proficient in it', implying that weaving skills were still widespread around that time.[56] We can assess what this would all mean in terms of labour input by approximating the hours of labour required for weaving imported yarn into cloth. Contemporary estimates suggest that the maximum amount of yarn that one Javanese hand-weaver could process within a month was 10 kg. Depending on the coarseness of the yarn, this yielded a piece of cloth of 7-9 square meters.[57] Since we have estimated the total volume of imported yarn (Figure 4 and Appendix), we can calculate how many full-time weaving months were required to process this yarn into woven cloth (see Table 1). If each 10 kg required one full-time weaver, she used 120 kg per year, so we need to divide the total volumes of imported yarn by 120 to arrive at the minimum number of weavers required (assuming full-time weaving activity). However, we know that most weavers only worked part-time and/or seasonally, so the actual numbers of women involved in weaving will have been much larger. Moreover, we should reckon with the fact that many weavers still used locally spun yarn until at least ca. 1870. This would add a substantial number of women-years in spinning as well as weaving to the figures in the table, at least for the decades before 1870.

[53] National Archives, The Hague (NA), Koloniën 1850-1900, inv. no. 2362, Verbalen, no. 80, 26 November 1870. Due to the high import duties, imoprts from elsewhere were negligible in this period.
[54] Van der Eng, 'Why Didn't Colonial Indonesia', pp.1023-4. Probably, Van der Eng consciously made conservative estimates to stay on the safe side, as I actually agree with his larger argument that – at least in the nineteenth century – de-industrialization of the Indonesian countryside should seriously be questioned. My figures are thus not intended to criticize Van der Eng's reasoning, but rather to take it a step further.
[55] As noted in the margins of the report. NA, Koloniën 1850-1900, 2362, 26 November 1870.
[56] ANRI, Residential Archives Priangan, 7/7, Algemeen verslag 1880.
[57] Dalenoord, 'Textiel-nijverheid', p.172; Jasper and Mas Pirngadie, *Weefkunst*, p.151-152.

Table 1 – Estimated woman years of weaving labour needed to process imported yarn (own calculations), Java, 1830-1920		
	woman years	index (1870=100)
1830	2,515	4
1840	12,000	21
1850	15,147	26
1860	30,102	53
1870	57,213	100
1880	125,507	219
1890	75,412	132
1900	178,098	311
1910	340,000	594
1920	152,129	266
Sources: see Appendix A		

The colonial report of 1905 provides crude employment figures on the Javanese population and states that around 825,000 women worked in industry at this time.[58] If we make the – rather moderate – assumption that half of them worked in textiles, this implies that 15 per cent of all women registered as being gainfully employed were active in textile production. The more reliable census of 1930 lists almost 500,000 women in textile production, which by then still constituted almost 10 per cent of all economically active women in Java and Madura.[59]

Multiple sources thus indicate that Javanese hand-weaving activity continued into the early twentieth century, although probably more concentrated in particular regions than in earlier periods. This was a consequence of the increasing development of (supra)regional markets, which in time made household textile self-sufficiency redundant, although spinning and especially weaving for household use persisted well into the twentieth century.[60] Budget studies from the 1880s show that women's part-time weaving activities accounted for 10 per cent of total household income.[61] And in 1910, researchers claimed that despite European competition, 'there are still many regions in the Archipelago where the population for their clothing prefers domestically produced fabrics, which are generally much stronger than the imported tissues'.[62] Moreover, there are indications that besides weaving, women increasingly engaged in cloth-finishing activities during the later years of the Cultivation

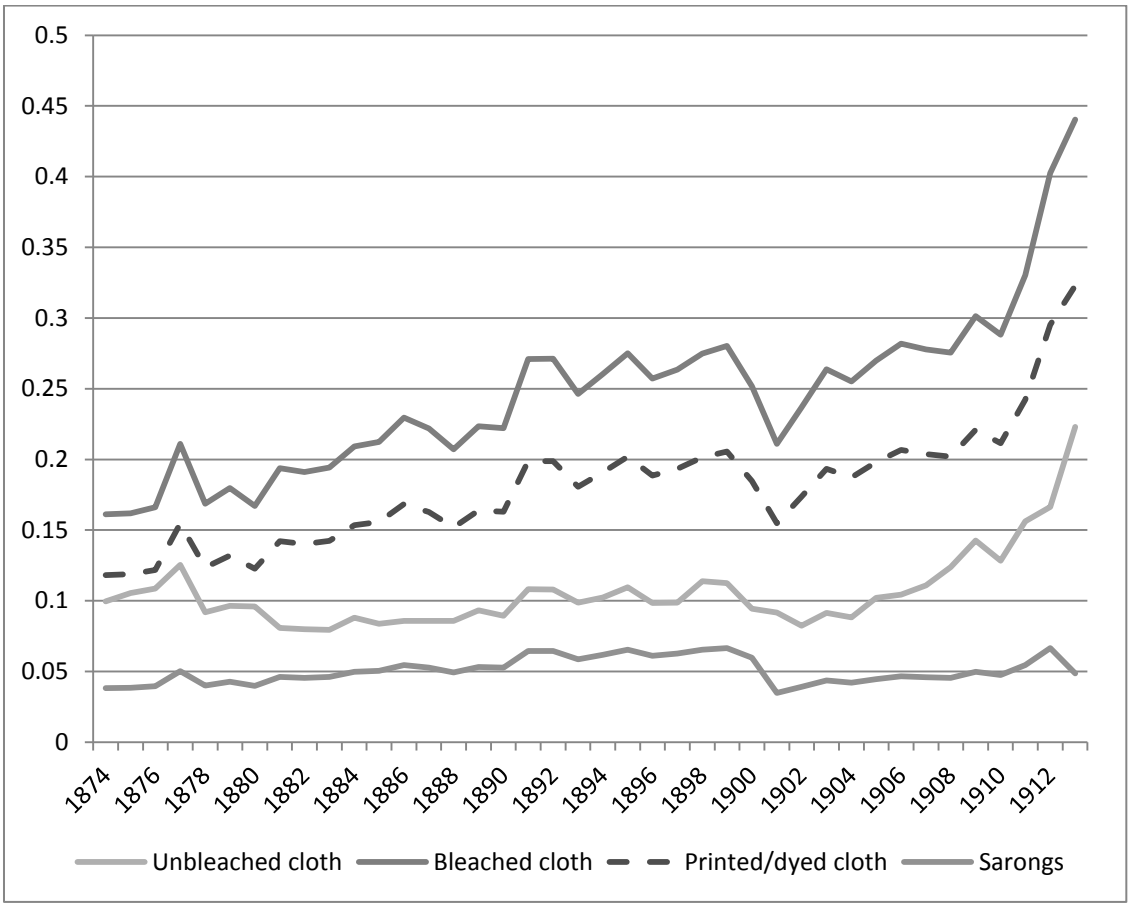
[58] NA, Koloniaal verslag 1907, Appendix A.
[59] CBS, *Volkstelling 1930*, pp.94-5.
[60] Jasper and Pirngadie, *Weefkunst*, p.6; Dalenoord, 'Textiel-nijverheid', pp.169-70.
[61] Arminius, 'Budget'.
[62] Jasper and Pirngadie, *Weefkunst*, p.2.

System. This is why it is relevant to question the second hypothesis under review here: to what extent were imported goods and locally produced goods indeed substitutes?

IV

As the British had already noticed during their interregnum over the East Indies (1811-1816), the Javanese population favoured locally finished cotton cloth over imported calicoes from England, due to the former's durability and the higher quality of the colours.[63] Traditional Indonesian waxprinting (*batik*), was an age-old craft initially dominated by elite women, but later taken up by broader sections of the population. It was a highly labour-intensive process that added a great deal of value to the finished product, making genuine *batik* cloth quite expensive.

Figure 5 – Imported cotton goods in the Netherlands Indies, 1874-1913 (in kgs per capita)



Source: Pierre van der Eng, *Database Indonesian Textiles*.

[63] Raffles, *History of Java*, p.241.

Colonial import statistics distinguish between different types of cotton goods from 1874 onwards, which allows us to take a closer look at possible substitution between imported finished goods and intermediate manufactures. Figure 5 shows that the majority of imports still consisted of *semi-finished* cloth towards the end of the nineteenth century. Per capita imports hardly rose between 1874 and 1910, and only started to take off more considerably on the eve of the First World War. Interestingly, most imported cloth was unfinished, bleached or unbleached cloth, to be further processed by indigenous producers. Indeed, during the 1860s, when the steepest boom in export prices of Indonesian plantation crops occurred (see Figure 1), the traditional, labour-intensive dyeing process, *batik*, came to be complemented by a new, more mechanical and labour-extensive block printing technique called *cap* (pronounced 'tjap', meaning 'stamp') *batik*. Block printing with the *cap*, a technology probably adopted from India, was regarded as 'the answer of the Javanese *batik* industry to European factory competition'.[64]

Native consumer tastes were crucial for the persistent – and perhaps renewed – demand for locally produced cloth. Since the quality of European printed calicoes did not live up to the standards of indigenous finishing techniques, imported factory-made fabrics consisted mainly of undyed fabric, which was consequently dyed and finished in Java.[65] Around this time, Javanese producers appear to have also started competing in the *lower-quality* textile segment. As a report notes:

> The time is gone, that the native exclusively focussed on the making of *batik* as a form of art, which were of exquisite beauty, but had to be recompensed likewise. Nowadays, he delivers products in this genre that, in quality related to the price, are in no sense inferior to those fabricated in Europe. To sustain competition with him, the European *batik* producer will need to be able to deliver his manufactures for a much fairer price.[66]

Cap batik was more affordable than traditional *batik*, because it was produced in a more standardized fashion. However, it was still of higher quality than the imported European coloured cloth. The patterns were no longer meticulously hand-painted. Instead, wax

[64] Rouffaer, 'Voornaamste industrieën', pp.21-2.
[65] Legêne, *Spiegelreflex*, p.125.
[66] NA, Koloniën 1850-1900, 2362, 26 November 1870.

patterns were simply stamped onto the fabric, making the process far less labour-intensive and, consequently, lowering the price of the finished product. An experienced craftsperson could print about 20 *sarongs* per day, whereas traditional *batik* took 12 to 15 days to produce only one.[67] Thus, labour productivity was enhanced with this new technology, without requiring large capital investments. Indeed, the wooden-with-copper stamps lasted well beyond an artisan's entire career.[68]

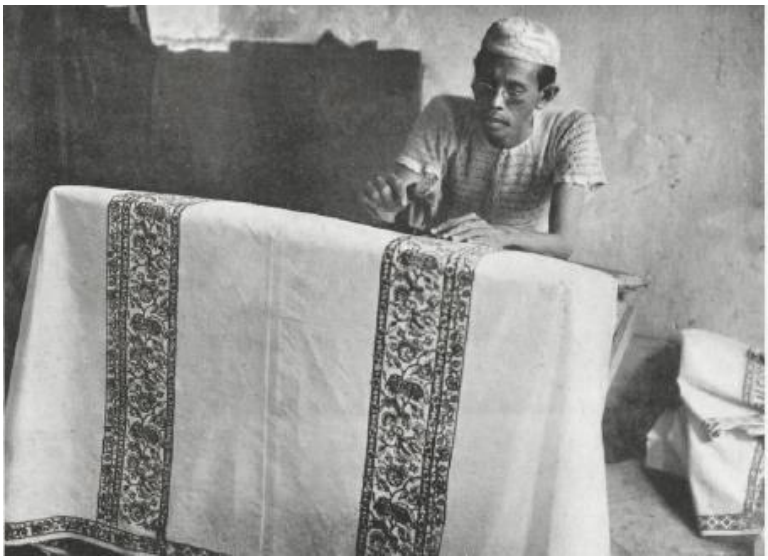
Picture 1 – Two Javanese women *batiking*, ca. 1910

Source: Jasper and Pirngadie, *De batikkunst*, p. 59.

Cap batik soon turned into a more or less mass-produced article that could compete very well with European imports. Interestingly, this renewed competitiveness also had a gender dimension, as traditional *batik* continued to be performed by women, while *cap batik* became an almost exclusively male activity. It is not clear why men dominated this craft, given that waxprinting had traditionally been the provenance of women. Perhaps this relates to the fact that this new technique was adapted from India, where calico printers had for centuries been male.[69]

[67] Jasper and Pirngadie, *De weefkunst*, p.79. It is worth mentioning that an older source stresses that 20 printed pieces of cloth was the maximum a printer could produce, and that he employed two to three journeymen to assist him. Rovers, 'Inlandsche katoen-industrie', p.413.
[68] Jasper and Pirngadie, *Batikkunst*, pp.27-8.
[69] Riello, 'Asian knowledge' .

Picture 2 – A Javanese man making *cap* cotton cloth, ca. 1910



Source: Jasper and Pirngadie, De batikkunst, p. 74.

Nevertheless, the introduction of *cap* block-printing did not suppress women from the labour market, but rather stimulated the demand for *batik* in general, thus raising the opportunities to participate in textile production for men *and* women alike.[70] Around 1900, it was observed that 'every native, who can somehow afford it, chooses the real *batiks* over the *cap*, and the *capped* cloth over the factory-made ones'.[71] Minimum estimates suggest that in the two residencies of Sala (East Java) and Pekalongan (Central North Java) alone, the annual production of hand-painted and *cap batiks* amounted to 5 million and 2 million guilders respectively.[72] Indigenous consumer preferences played a large role in the demand for these textile goods. According to a late nineteenth-century observer, the continuing demand for hand-painted *batik* was related to 'the love of the Javan for monstrous and impossible shapes', which did not accord as well with the symmetry of the stamping technique, compared to the more whimsical results of traditional *batik*.[73]

With respect to technological change, Dutch colonial policy had never explicitly been directed towards industrializing textile production in the Netherlands East Indies. Under the

[70] de Kat Angelino, *Rapport*, p.XIV.
[71] Rouffaer, 'Voornaamste industrieën', pp.26-7.
[72] Jasper and Pirngadie, *Batikkunst*, p.10.
[73] Rovers, 'Inlandsche katoen-industrie', p.420.

CS, the focus had been on producing export commodities. Consequently, any large-scale industrial activity that was promoted was related to the processing of cash crops, including sugar refining and, towards the end of the nineteenth century, mechanized oil extraction and processing.[74] Textiles were not yet among the industries to be mechanized and industrialized on a large scale, nor was textile production particularly concentrated: colonial statistics in 1919 only mention two weaving workshops with more than five paid workers. This probably again relates to the gender division of work in textile production: women still wove part-time in the home industry, allowing them to engage simultaneously in domestic task and subsistence agriculture. In contrast, *cap batik* had become a more centrally organized, full-time wage employment prospect for men. Larger cloth-finishing workshops with several wage workers were established. In 1919, Java counted 362 workshops, which employed a combined total of over 6,000 workers (on average 17 workers per workshop).[75]

The First World War constituted a clear trend break in the supply of textiles on the domestic market. If the colonial Indonesian economy de-industrialized, the process originated in the Interbellum period, and was only partial and tempory. This was induced by competition from other parts of the Asian periphery, most notably Japan, which had industrialized spectacularly over the previous decades. In 1914, 90 per cent of all imports into the archipelago had still originated from Europe, but competition changed dramatically during the Interbellum.[76] For the first time, combined imports of European and Asian cloth started to seriously depress indigenous weaving, which had remained very viable up to the First World War. Although yarn imports somewhat recovered in the early 1920s, levels stabilized to a lower level than before the war (see Appendix). Still, after the First World War, competition with imported woven cloth was maintained to some degree by specializing in the production of colourful sarongs, for which new indigenous markets evolved, or by reorganizing labour.[77] Since the early twentieth century, a divide had emerged between consumer demand in West Java and the North Coast of the island, where the inhabitants adopted the West-Javanese habit of wearing colourfully hand woven *sarongs*, and Middle and East Java, where men and women primarily wore *batik sarongs*.[78] For indigenous hand-

[74] Dick, 'Nineteenth-century industrialization', p.123.
[75] Segers, *Manufacturing industry*, pp.73-4.
[76] Lindblad, 'Handel in katoentjes', p.97.
[77] *Ibid.*, p.173.
[78] Van Warmelo, 'Ontstaan en groei', p.10.

weaving, to continue to be competitive with the increasing imports from Japan after the First World War, this implied a restructuring in terms of labour organization. Handloom-weaving was increasingly organized via a 'proto-industrial' *Verlag*-system (called '*bakul*'), in which entrepreneurs put out yarns in the region to be woven by women in their own households (see Picture 3). The women no longer sold the finished product themselves, but received a wage in return for their weaving activities.[79]

Picture 3 – Female sarong weaver in the domestic industry, Bandung, Java, ca. 1930.

Source: Collection Tropenmuseum: Sarongweefster uit Bandoeng Java, TMnr 10014439 CC.

Indigenous *batik* and *cap batik* production also remained important in the 1920s despite increasing imports of coloured and printed calicoes. In the city of Batavia alone, the number of *batik* workshops rose from 103 in 1910 to 288 in 1924, and it was estimated that in West-Java, this industry employed a minimum of 10,000 workers, including at least 6,000 women. Furthermore, there were thousands of women producing *batik* as a domestic industry, moving in and out of the business seasonally.[80] Some up-scaling of production in larger workshops occurred in this period. Often, Chinese or Arab merchants, who were more likely than the ethnic Javanese to own sufficient capital to set up a business, employed a large

[79] Matsuo, *Javanese cotton industry*, pp.36-40.
[80] de Kat Angelino, *Rapport*, pp.4-7.

number of workers.[81] On average, *batik* workshops employed 12 workers in 1919, but given that many of these workshops employed only 1-5 wage workers, there must have also been much larger shops employing over 20 people.[82] According to a contemporary observation, in larger workshops coolies often moved with their wives and children into the *batik* compounds, where they could earn a reasonable living, provided that all family members worked.[83] Moreover, these industries and workshops started to become more concentrated in particular regions. This brings us to the final assumption of the de-industrialization thesis: the relative weight of international trade as opposed to domestic markets in inducing patters of labour division.

V

Although the actual reconstructions of population figures in colonial Java vary, historians agree that the nineteenth century was a period of exceptional demographic development, with high average annual growth rates.[84] While population growth in itself implies that total internal demand for textiles grew, it is of course also important to look at the possibilities for indigenous people to sustain or expand their per capita consumption of textiles. Some historians, like Fasseur and Elson, have suggested that an increase in the importation of textiles signalled a corresponding increase in indigenous purchasing power. Others, like Boomgaard and Booth, have argued that this cannot be interpreted as such because prices of imported textiles decreased over time, and total per capita demand probably had not risen because local production had waned.[85]

There are, however, three arguments for taking the demand in the indigenous market seriously. First, in absolute numbers, the demand for textiles from indigenous markets obviously expanded with population growth. Second, as Van der Eng's recent estimates suggest (see Figure 3), per capita consumption did *not* decline, except perhaps in the 1830s to early 1850s, when the demands of the CS were most pressing on indigenous households. Indeed, while the debate on the development of nineteenth-century Javanese living standards is undecided, historians such as Elson, Booth and Boomgaard all agree that

[81] *Ibid.*, p.10.
[82] Segers, *Manufacturing industry*, pp.73-4.
[83] de Kat Angelino, *Rapport*, p.16.
[84] Ranging from annual growth rates of 1.4 to 1.6 per cent over the century as a whole, with the fastest growth in the period 1850-1900. Boomgaard and Gooszen, *Population trends*.
[85] See for the various viewpoints: Booth, *Indonesian Economy*, pp.96-7.

this was a particularly harsh period for indigenous households.[86] The 1840s and 1850s saw the heyday of the CS, and GDP per capita displayed a negative annual growth rate of 0.4 per cent.[87] Nevertheless, the economic tide changed somewhat after the 1850s when per capita income rose. According to Van der Eng, rising living standards in this period may have pushed up textile consumption to an annual average of 0.9-1.0 kg per capita (around 2 sarongs).[88] Evidence from sixty-three household surveys in the residency of Semarang around 1900 shows that peasants spent on average 14 per cent of their disposable budget on clothing.[89] Somewhat earlier (although less extensive) evidence from a budget study in 1878 reports a similar 13 per cent expenditure on clothing.[90] This all suggests that Javanese families could spend a reasonable share of their income on clothing, which they were able to economize on in times of crisis, such as the Semarang floodings in 1901.[91] Third, as we have seen, indigenous textile production did not decline, but rather changed form in the nineteenth century, as local producers began making use of semi-finished imported cotton goods to serve the particular demands of indigenous markets.

Alongside population growth, two consequences of colonial economic policies further enhanced the growth of internal markets: infrastructural investments and on-going monetization of the economy. In order to transport goods cultivated under the CS, vast infrastructural expansions were required and implemented by the colonial authorities. From the 1830s onwards, a large number of paved roads and stone bridges were constructed, enabling trade routes and lowering transport costs to an unprecedented degree.[92] Moreover, in towns like Batavia, Semarang and Surabaya, corvée labourers built warehouses and offices to facilitate trade. However, wage earners soon began to replace coerced labour in these building projects, as forced labour became criticized from the 1850s onwards.[93] As population growth accelerated after 1850, the pressure on land intensified, and the growing number of landless peasants provided a supply of wage labourers, who now had to

[86] Boomgaard, *Children of the colonial state*, p.202; Booth, *The Indonesian economy*, p.94; Elson, *Village Java*, pp.304-319.
[87] Van Zanden and Marks, *Economic history*, p.50.
[88] Van der Eng, 'Why did Colonial Indonesia', p.1024.
[89] *Verslag*, Appendix L.
[90] Sollewijn Gelpke, *Bijdrage*, p.188.
[91] *Verslag*, Appendix L.
[92] Elson, *Village Java*, pp.84-5.
[93] Fernando, 'Growth', p.95.

buy most of their food and clothing in the market.[94] Apart from providing a demand for textiles, the shrinking of average landholdings in combination with monetization and improved trade infrastructure possibly also created an incentive for peasants who still remained on their land to pursue additional income by the production of textiles for local and regional markets. Increasing references to the flourishing of local markets in the residential archives from the 1850s through the 1880s attest to this.[95] In Priangan in 1855, for instance, the value of exports of woven textiles constituted almost 30 per cent of all exports in that year. Most of this cloth was traded with other residencies in Java.[96] Although quantitative information on the trade in indigenous textiles is hard to find, more indirect evidence on the taxation of businesses shows that markets expanded in the decades before the turn of the century, most notably in the 1870s and 1880s. Table 2 indicates the increase in the taxation of Indonesian entrepreneurs (Europeans were registered separately). Both total taxes and per capita levies rose markedly until 1886, signifying a general upsurge of indigenous market activities.

Table 2 – Taxation of indigenous entreprises, 1867-1902

Period	x1,000 Dfl	Increase compared to previous period	Population (x 1,000)	Per capita	Per capita increase
1867-1871	773		15766	0.05	
1872-1876	1270	64%	17783	0.07	46%
1877-1881	2190	72%	19202	0.11	60%
1882-1886	2823	29%	20563	0.14	20%
1888-1892	2864	1%	23372	0.12	-11%
1893-1897	2878	0.5%	26332	0.11	-11%
1898-1902	3117	8%	28386	0.11	0.5%

Source: Jaarcijfers 1900, p.102.

Increasing commercialization and infrastructural works did lead to regional specialization. By the beginning of the twentieth century, specialized textile centres had developed in Priangan, Krawang, Japara, Bagelan, Yogyakarta, and Madiun.[97] Colonial authorities noted around 1890 that in Priangan

[94] Boomgaard, 'Why work for wages?', p.50.
[95] E.g. ANRI, Residential Archives Priangan, 3/12, Algemeen verslag 1849 and 30/4, Kort overzicht statistiek Preanger Regentschappen 1852; Residential Archives Cirebon, 3/8, Algemeen verslag 1850 and 4/5, Algemeen verslag 1860; Residential Archives Batavia, 324/7, Algemeen verslag 1880.
[96] ANRI, Residential Archives Priangan, 4/4, Algemeen verslag 1855.
[97] Matsuo, *Javanese cotton industry*, p.15.

> ‘there is hardly a quarter, a hamlet or a house where the clattering of the handloom does not resonate. That which the industrious mother of the house produces more than is needed for the clothing of the family, she brings to the market. Indeed, it is only a plain tissue, but due to the reliability of the good and its reasonable price (Dfl. 1.50 à f 3.-), this indigenous fabric can easily compete with the European calicoes, which testifies to the fact that cheap is expensive.’[98]

All in all, there are thus quantitative as well as qualitative indications that it was not so much *international*, but rather *internal* trade that facilitated the demand for, and thus the persistence of, indigenous weaving and *batik* production.

VI

The de-industrialization of Java’s traditionally important textile industry should be seriously questioned. Both the qualitative and quantitative evidence presented in this study suggests that Dutch colonial policies and European textile imports perhaps altered indigenous production, but did not fundamentally damage it. Although in the first few decades after the implementation of the Cultivation System many Javanese may have had less time and money to respectively make or buy indigenous cloth, this changed from the 1850s onwards. The key to this was the flexibility of households’ – especially women’s – time, which enabled a continuation of hand-weaving and *batik* production. Female labour was *neither fully employed nor perfectly substitutable*, as the first assumption under scrutiny in this article suggests, but rather alternately employed in agricultural, textile production, and other domestic tasks. Because married women were less easily employable outside the immediate environment of the household, the opportunity costs of their labour were generally low. Thus, the extra hours they spent at the loom could compete with imported factory-made cloth. This was not the case, however, with hand-spinning, which took up much more time than weaving, and yielded a lower profit. Therefore, the increasing imports of European yarns in the late nineteenth century more likely stimulated rather than hampered local textile production.

[98] Quoted in Rouffaer, ‘Voornaamste industrieën’, p.12.

This leads us to the second assumption that was tested here, regarding the homogeneity and full substitutability of manufacturing products. Many of the hundreds of thousands of women recorded as textile workers performed the craft of *batik* and increasingly used semi-finished white cloth from the Netherlands or elsewhere in Europe. The quality of the cloth finished by indigenous people was higher, and although it was more expensive than the factory-dyed calicoes, the Javanese population favoured it. From the end of the 1850s, this demand stimulated the development of new wax-stamping techniques that enabled the production of more standardized *cap batik*, which was cheaper than hand-painted *batik*, and still preferred over factory-made imports. The higher productivity of *cap batik* meant that it was profitable as a full-time employment. Interestingly, this was taken up primarily by Javanese men. In the beginning of the 1920s, *cap batik* was increasingly organized in larger workshops, but still remained hand-work. The same was true for the weaving of colourful *sarongs*, another specialized local cloth that continued to be produced by women, mostly from their homes, but – in urban areas – also increasingly in larger workshops.[99] This aligns with the phenomenon of labour-intensive industrialization, that has been observed more generally for nineteenth- and twentieth-century Asia.

The consumers of these indigenous fabrics were to a large extent the Javanese themselves. As explained in the previous section, increasing demand was fuelled by a combination of explosive population growth and the stimulation of infrastructure and monetization due to the CS and other colonial policies. Thus, it was internal – rather than international – markets that sustained local textile production. This leads to the third, and final, emphasis of Williamson's de-industrialization thesis, which is external trade. By exclusively focusing on import and export statistics to determine external terms of trade, Williamson neglects important *internal* developments, like those outlined in this article. By distinghuishing precisely which goods were imported, the specifics of local demand and indigenous production can be more clearly delineated, as this article and the recent work of Van der Eng have shown.

Clearly, Javanese households had much to lose from extractive colonial policies and demands in the nineteenth and early twentieth centuries. However, as this article indicates, many households attempted to adapt to the constraints they were under, such as forced

[99] Only from the 1920s, the Dutch – at first quite modestly - started to stimulate technological innovations in the Javanese textile industry, with the establishment of the Bandung Textile Institute. Aten, 'Enige aantekeningen', p. 195.

cultivation, imports of textiles, and declining proportions of land, by finding alternative economic activities. One important way of doing this was by flexibly using (married) women's time for the production of woven cloth and *batik*. When agricultural times were slack, which occurred more frequently when the pressure on land increased, textile production was a viable side-occupation due to sustained indigenous demand. Expanding our notion of industrialization to labour-intensive production and internally induced consumption, with an eye to the agency of colonial households and gender relations, may thus shed new light on the economic and social history of the 'periphery'.

Footnote references

Allen, R.C., e.a., 'Wages, prices, and living standards in China, 1738–1925 in comparison with Europe, Japan, and India', *Economic History Review*, 64, S1 (2011), pp.8-38.

Arminius, 'Het budget van een Javaanschen landbouwer', *De Indische Gids* 11:2 (1889), pp.1685-1720,1885-1917,2149-2186.

Austin, G., 'Resources, techniques, and strategies south of the Sahara: revising the factor endowments perspective on African economic development, 1500-2000', *The Economic History Review*, 61 (2008), pp.587-624.

Austin, G., and Sugihara, K., 'Introduction', in: Gareth Austin and Kaoru Sugihara (eds), *Labour-intensive industrialization in global history* (London/New York, 2013), pp.1-19.

Aten, A., 'Enige aantekeningen over de nijverheid in Indonesië', *Indonesië. Tweemaandelijks tijdschrift gewijd aan het Indonesisch cultuurgebied*, 6, 3 (1952), pp. 193-216.

Bauer, P.T., *Dissent on development. Studies and debates in development economics* (Cambridge (MA), 1976).

Bijdragen van het Statistisch Instituut (Amsterdam, 1887)

Boomgaard, P., 'Female labour and population growth on nineteenth-century Java', *Review of Indonesian and Malayan Affairs*, 15 (1981), pp.1-31.

Boomgaard, P., *Children of the colonial state: population growth and economic development in Java, 1795-1880* (Amsterdam, 1989).

Boomgaard, P., and A.J. Gooszen, *Population trends 1795-1942. Changing economy of Indonesia*, vol. 11 (Amsterdam, 1991).

Booth, A., *The Indonesian economy in the nineteenth and twentieth centuries: a history of missed opportunities* (Basingstoke/New York, 1998).

Booth, A., *The Indonesian economy in the nineteenth and twentieth century: a history of missed opportunities* (Basingstoke/New York, 1998).

Broadberry, S., and B. Gupta, 'The Early Modern Great Divergence: wages, prices and economic development in Europe and Asia, 1500–1800', *Economic History Review*, 59 (2006), pp.2-31.

Broadberry, S., and B. Gupta, 'Lancashire, India, and shifting competitive advantage in cotton textiles, 1700–1850: the neglected role of factor prices', *Economic History Review*, 62 (2009), pp.279–305.

Centraal Bureau voor de Statistiek (CBS), *Volkstelling 1930, Deel III: Inheemse bevolking van Oost-Java* (Batavia, 1934).

Chandavarkar, R., 'Industrialization in India before 1947: Conventional approaches and alternative perspectives', *Modern Asian Studies*, 19 (1985), pp.623-68.

Clarence-Smith, W.G., 'The Production of Cotton Textiles in Early Modern South-East Asia', in: Giorgio Riello and Prassanan Parthasarathi (eds), *The Spinning World. A Global History of Cotton Textiles, 1200-1850* (Oxford, 2009), pp.127-42.

Dalenoord, G., 'Textiel-nijverheid in Nederlandsch-Indië', *Koloniale Studiën* (1926), pp.167-91.

Dick, H., 'Nineteenth-century industrialization: a missed opportunity?', in: J.Th. Lindblad (ed.), *New challenges in the modern economic history of Indonesia* (Leiden, 1993), pp.123-49.

Elson, R.E., *Village Java under the Cultivation System, 1830-1870* (Sydney, 1994).

Fasseur,C., *Kultuurstelsel en koloniale baten. De Nederlandse exploitatie van Java 1840-1860* (Leiden, 1975).

Fernando, M.R., 'Growth of non-agricultural economic activities in Java, 1820-1880', in: Lindblad, *New challenges*, pp.89-109.

Frank, A.G., 'The development of underdevelopment', *Monthly Review* 18, 4 (1966), pp.17-31.

de Graaf, T., *Voor handel en maatschappij. Geschiedenis van de Nederlandsche Handel-Maatschappij, 1824-1964* (Amsterdam, 2012).

Hall, K., 'The textile industry in Southeast Asia, 1400-1800', *Journal of the Economic and Social History of the Orient* 39 (1996), pp.87-135.

Haynes, D.E., *Small town capitalism in Western India. Artisans, merchants, and the making of the informal economy, 1870–1960* (Cambridge, 2012).

Jaarcijfers voor het Koninkrijk der Nederlanden. Kolonien 1900 ('s-Gravenhage, 1902).

Jansen, M., *De industriële ontwikkeling in Nederland 1800-1850* (Amsterdam, 1999).

Jasper, J.E., and Mas Pirngadie, *De inlandsche kunstnijverheid in Nederlandsch Indië. Vol. II, De weefkunst* (The Hague, 1912).

Jasper, J.E., and Mas Pirngadie, *De inlandsche kunstnijverheid in Nederlandsch Indië. Vol. III, De batikkunst* (The Hague, 1916).

Johnson, C.H., 'Introduction: de-industrialization and globalization', *International Review of Social History*, 47 (2002), pp.3-33.

de Kat Angelino, P., *Rapport betreffende eene gehouden enquête naar de arbeidstoestanden in de batikkerijen op Java en Madoera door den inspecteur bij het kantoor van arbeid* (Weltevreden, 1930).

Kerr, C., F. H. Harbison, J. T. Dunlop and C. A. Myers, *Industrialism and industrial Man: The problems of labour and management in economic growth* (London, 1962).

Korthals Altes, W.L., *General trade statistics 1822-1940. Changing economy of Indonesia*, vol. 12 (Amsterdam, 1991).

Kravis, I.B., 'Trade as a handmaiden of growth: Similarities between the nineteenth and twentieth centuries', *The Economic Journal*, 80 (1970), pp.850-72.

Kriedte, P., H. Medick and J. Schlumbohm, *Industrialization before industrialization: rural industry in the genesis of capitalism*(Cambridge/New York, 1981).

Landes, D., *The unbound Prometheus: technological change and industrial development in Western Europe from 1750 to the present* (Cambridge, 1969).

Legêne, S., *Spiegelreflex. Culturele sporen van de koloniale ervaring* (Amsterdam, 2010).

Lindblad, J.Th., 'De handel in katoentjes op Nederlands-Indië, 1824-1939', *Textielhistorische Bijdragen*, 34 (1994), pp.89-104.

Matsuo, H., *The development of Javanese cotton industry* (Tokyo, 1970).

Mokyr, J. (ed.), *The British Industrial Revolution: an economic perspective* (Boulder, 1999 [2nd ed.])

Muller Szoon, Hendrik, *De Nederlandsche katoennijverheid, en het stelsel van bescherming in Nederlandsch-Indië* (Rotterdam, 1857).

Parthasarathi, P., 'Rethinking wages and competitiveness in the eighteenth century: Britain and South India', *Past and Present*, 158 (1998), pp.79-109.

Pike, A., 'De-industrialization', in: R. Kitchin and N. Thrift eds, *International encyclopedia of human geography* (Amsterdam etc., 2009), pp.51-59.

Pomeranz, K., *The Great Divergence. China, Europe, and the making of the modern world economy* (Princeton, 2000).

Raffles, T.S., *The History of Java. Vol. I* (London, 2nd ed. 1830).

Riello, G., 'Asian knowledge and the development of calico printing in Europe in the seventeenth and eighteenth centuries', *Journal of Global History*, 5, 1 (2010), pp.1-28.

Rodney, W., *How Europe Underdeveloped Africa* (London etc., 1972).

Rouffaer, G.P., 'Aanhangsel: de voornaamste industrieën der inlandsche bevolking van Java en Madoera', appendix to: C. Th. Van Deventer, *Overzicht van der economischen toestand der inlandsche bevolking van Java en Madoera* (The Hague, 1904).

Rostow, W., *The stages of economic growth: a non-Communist Manifesto* (Cambridge, 1960).

Rovers, J.L., 'Inlandsche katoen-industrie op Java', *Tijdschrift voor nijverheid en landbouw in Nederlandsch-Indië*, 18 (1873), pp.411-30.

Roy, T., *Artisans and industrialization: Indian weaving in the twentieth century* (Delhi, 1993).

Roy, T., 'Labour intensity and industrialisation in colonial India', in: Austin and Sugihara, *Labour-Intensive Industrialization*, pp.107-21.

Segers, W., *Manufacturing industry 1870-1942. Changing economy in Indonesia,* vol. 8 (The Hague, 1988).

Sollewijn Gelpke, J.H.F., *Eene bijdrage tot de land- en volkenkunde van Java 2* (Batavia, 1879).

Stoler, A., 'Class structure and female autonomy in rural Java', *Signs*, 3 (1977), pp.74-89.

Sugihara, K., 'Labour-Intensive industrialization in global history: an interpretation of east asian experiences', in: Austin and Sugihara, *Labour-Intensive Industrialization*, pp.20-64.

Van der Eng, P., 'Why didn't colonial Indonesia have a competitive cotton textile industry?', *Modern Asian Studies*, 47 (2013), pp.1019-54.

Verslag van den waters- en voedingnood te Semarang uitgebracht door de Commissie, ingesteld bij Gouvernements Besluit d.d. 2 Juli 1902 (Buitenzorg, 1903), Appendix L.

Van Warmelo, 'Ontstaan en groei van de handweefnijverheid in Madjalaja', *Koloniale Studiën*, 23 (1939), pp.5-25.

Wallerstein, I., *The Modern World System III. The second era of great expansion of the capitalist world-economy, 1730-1840* (San Diego, 1989).

Watson Andaya, B., 'The cloth trade in Jambi and Palembang society during the seventeenth and eighteenth centuries', *Indonesia*, 48 (1989), pp.27-46.

Watson Andaya, B., *The flaming womb. Repositioning women in early modern Southeast Asia* (Honolulu, 2006).

Williamson, J.G., 'Globalization and the Great Divergence: terms of trade booms, volatility and the poor periphery', *European Review of Economic History*, 12 (2008), pp.355-91.

Williamson, J.G., *Trade and poverty: when the Third World fell behind* (Cambridge MA/London, 2013 [paperback edition, original edition 2011]).

van Zanden, J.L., and A. van Riel, *The strictures of inheritance. The Dutch economy in the nineteenth century* (Princeton, 2004).

van Zanden, J.L., and D. Marks, *An economic history of Indonesia 1800–2010* (London, 2012).

Appendix – Yarn imports in value, volume, and estimated labour needed to process in weaving, 1828-1923

This Appendix provides estimates of the amount of women-years of weaving needed to process the imported yarn on Java. Trade statistics did not mention the imported volumes of yarn, but only its value, and trade volumes were only available for a number of years (1840, 1845, 1849, 1868, 1878, 1904-1923). Also, market prices for Java were not available. Therefore, I have extrapolated yarn prices on the Dutch market (source: Van Riel, Database prices and wages, including a .26 mark-up for transport costs and import duties, and divided the imports in value by the estimated yarn prices. For the years in which information on trade volumes were indeed given, these extrapolations matched the estimated series of yarn prices very well. Once quantities of imported yarn are known, we can also make estimates of the required time to process these for weaving. The final column reports these estimates. The calculations are based on the estimate of Dalenoord (1926), who reported that, taking an average coarseness of yarn, a maximum of 10 metres per month could be woven from one kilogramme of factory yarn. It should of course be taken into account that these are fulltime women-years, whereas many weavers worked on a parttime basis, so the actual number of textile workers was much larger. Moreover, especially until the 1870s, many women also wove from hand-spun yarn, adding tens of thousands of textile workers which can not be estimated due to lack of data.

Year	*Imports of yarn, value in Dfl. 1,000*[100, 101,102]	*Volume in tonnes*[103]	*5-year moving average*	*Yarn price Dfl. per kg*	*Source:*	*Total population (x1,000)*[104]	*Woman years of weaving labour needed to process yarn imports*[105]
1828	1	1		1.47	extrapolated		57
1829	4	3		1.40	extrapolated		238
1830	43	30	22	1.42	extrapolated		2,515
1831	55	42	27	1.32	extrapolated	7,149	3,480
1832	49	37	33	1.33	extrapolated	7,306	3,072
1833	43	25	32	1.71	extrapolated	7,420	2,100
1834	56	31	35	1.80	extrapolated	7,496	2,598
1835	49	23	43	2.16	extrapolated	7,531	1,895
1836	136	61	60	2.22	extrapolated	7,677	5,109
1837	142	73	77	1.94	extrapolated	7,859	6,100
1838	179	112	102	1.60	extrapolated	8,058	9,332
1839	206	118	122	1.74	extrapolated	8,268	9,854
1840	199	144	149	1.38	See footnote i.	8,481	12,000

[100] *Source 1828-1854*: Muller, *Nederlandsche katoennijverheid*.
[101] *Source 1855-1873*: *Bijdragen*, p.415
[102] *Source 1874-1940*: Korthals Altes, *General trade statistics*, pp.107-112
[103] Extrapolated, unless source mentioned in column 6.
[104] *Source:* Boomgaard & Gooszen, *Population trends*.
[105] Own calculations, ca. 10 m per kg = 1 month work; Dalenoord, 'Textiel-nijverheid', p.172.

1841	216	160	168	1.35	extrapolated	8,673	13,363
1842	261	211	192	1.24	extrapolated	8,869	17,551
1843	229	209	222	1.10	extrapolated	9,037	17,418
1844	256	238	274	1.08	extrapolated	9,142	19,797
1845	290	294	267	0.99	See footnote i.	9,377	24,500
1846	457	419	297	1.09	Extrapolated	9,534	34,904
1847	251	177	343	1.42	Extrapolated	9,612	14,742
1848	334	358	321	0.93	Extrapolated	9,625	29,802
1849	463	470	289	0.99	See footnote i.	9,444	39,167
1850	340	182	285	1.87	extrapolated	9,452	15,147
1851	468	259	263	1.81	extrapolated	9,611	21,578
1852	298	156	229	1.91	extrapolated	9,845	13,012
1853	468	249	236	1.88	extrapolated	10,113	20,709
1854	535	300	207	1.78	extrapolated	10,417	25,017
1855	386	215	237	1.79	extrapolated	10,732	17,923
1856	211	117	269	1.81	extrapolated	11,109	9,729
1857	567	303	279	1.87	extrapolated	11,409	25,260
1858	755	412	309	1.83	extrapolated	11,748	34,331
1859	628	350	392	1.79	extrapolated	12,127	29,159
1860	662	361	376	1.83	extrapolated	12,514	30,102
1861	985	534	308	1.85	extrapolated	12,829	44,483
1862	495	221	256	2.24	extrapolated	13,184	18,439
1863	257	72	323	3.56	extrapolated	13,451	6,009
1864	408	92	285	4.45	extrapolated	13,709	7,642
1865	2,198	698	326	3.15	extrapolated	13,958	58,202
1866	969	339	411	2.86	extrapolated	14,366	28,270
1867	948	426	528	2.22	extrapolated	14,826	35,514
1868	1,005	500	526	2.01	See footnote vii.[106]	15,330	41,667
1869	1,429	677	596	2.11	extrapolated	15,785	56,419
1870	1,345	687	628	1.96	extrapolated	16,230	57,213
1871	1,187	691	710	1.72	extrapolated	16,658	57,546
1872	1,131	585	833	1.93	extrapolated	17,136	48,739
1873	1,681	911	989	1.85	extrapolated	17,539	75,914
1874	2,140	1,292	1,272	1.66	extrapolated	17,891	107,708
1875	2,294	1,464	1,598	1.57	extrapolated	18,089	121,977
1876	2,929	2,107	1,916	1.39	extrapolated	18,258	175,563
1877	2,967	2,215	2,129	1.34	extrapolated	18,578	184,552
1878	3,351	2,500	2,138	1.34	See footnote vii.	18,823	208,333
1879	3,015	2,362	2,351	1.28	extrapolated	19,045	196,822
1880	2,151	1,506	2,424	1.43	extrapolated	19,541	125,507
1881	4,249	3,172	2,335	1.34	extrapolated	20,021	264,294
1882	3,591	2,583	2,446	1.39	extrapolated	20,185	215,243
1883	2,619	2,052	2,714	1.28	extrapolated	20,263	170,970
1884	3,649	2,916	2,580	1.25	extrapolated	20,436	243,022
1885	3,494	2,850	2,474	1.23	extrapolated	20,725	237,497

[106] Van der Eng, 'Why didn't colonial Indonesia', p.1034.

1886	2,719	2,501	2,541	1.09	extrapolated	21,205	208,457
1887	2,335	2,053	2,396	1.14	extrapolated	22,140	171,061
1888	2,775	2,387	2,007	1.16	extrapolated	22,527	198,876
1889	2,600	2,188	1,743	1.19	extrapolated	22,806	182,370
1890	1,098	905	1,619	1.21	extrapolated	23,730	75,412
1891	1,299	1,181	1,458	1.10	extrapolated	23,826	98,446
1892	1,323	1,434	1,389	0.92	extrapolated	23,973	119,493
1893	1,598	1,580	1,580	1.01	extrapolated	24,280	131,702
1894	1,609	1,845	1,661	0.87	extrapolated	24,746	153,749
1895	1,480	1,859	1,753	0.80	extrapolated	n.d.	154,892
1896	1,484	1,587	1,926	0.94	extrapolated	n.d.	132,224
1897	1,627	1,893	1,996	0.86	extrapolated	29,971	157,756
1898	1,887	2,448	2,052	0.77	extrapolated	n.d.	203,962
1899	1,721	2,196	2,206	0.78	extrapolated	n.d.	183,019
1900	2,296	2,137	2,392	1.07	extrapolated	28,386	178,098
1901	2,442	2,356	2,381	1.04	extrapolated	n.d.	196,353
1902	2,676	2,823	2,542	0.95	extrapolated	n.d.	235,251
1903	2,569	2,391	2,834	1.07	extrapolated	n.d.	199,275
1904	2,564	3,000	3,223	1.35	See footnote viii.[107]	n.d.	250,000
1905	2,980	3,600	3,518	1.56	See footnote viii.	25,455	300,000
1906	2,978	4,300	3,840	1.56	See footnote viii.	n.d.	358,333
1907	2,827	4,300	4,056	1.48	See footnote viii.	n.d.	358,333
1908	3,371	4,000	4,216	1.77	See footnote viii.	n.d.	333,333
1909	3,318	4,080	4,156	1.74	See footnote viii.	n.d.	340,000
1910	3,060	4,400	4,256	1.60	See footnote viii.	n.d.	366,667
1911	3,649	4,000	4,456	1.91	See footnote viii.	n.d.	333,333
1912	3,847	4,800	4,440	2.01	See footnote viii.	31,505	400,000
1913	3,634	5,000	4,112	1.90	See footnote viii.	31,850	416,667
1914	3,452	4,000	3,768	1.80	See footnote viii.	32,438	333,333
1915	3,141	2,760	3,214	1.64	See footnote viii.	32,873	230,000
1916	3,692	2,278	2,481	1.62	See footnote viii.	33,244	189,861
1917	3,705	2,033	2,047	1.82	See footnote viii.	33,578	169,386
1918	3,038	1,333	1,860	2.28	See footnote viii.	33,377	111,091
1919	3,035	1,832	1,827	1.66	See footnote viii.	33,128	152,640
1920	6,935	1,826	1,832	3.80	See footnote viii.	34,433	152,129
1921	8,103	2,112	1,979	3.84	See footnote viii.	34,464	175,988
1922	4,496	2,057		2.19	See footnote viii.	34,801	171,383
1923	5,147	2,067		2.49	See footnote viii.	n.d.	172,244

[107] Dalenoord, 'Textiel-nijverheid', p.169.