

Forestsandfinance.org Methodology

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Introduction

[Forestsandfinance.org](http://forestsandfinance.org) aims to highlight the role that finance plays in enabling tropical deforestation. It is the result of extensive research and investigations by a coalition of campaign and research organisations including Rainforest Action Network, TuK INDONESIA, and Profundo. Collectively, these organisations and their allies seek to achieve improved financial sector policies and systems that prevent financial institutions from supporting the kind of environmental and social abuses that are all too common in the operations of their forest-risk sector clients. The project assesses the financial services received by over 180 companies directly involved in the palm oil, pulp & paper, rubber and tropical timber ("forest-risk sector") supply chains, whose operations impact natural tropical forests in the Asia-Pacific region. For more information please contact info@forestsandfinance.org.

This Methodology note outlines the company selection methodology, the types of finance included in the study, and the calculated elements in the financial research. This research included two categories of calculated elements: 1) financial institution financing contributions, and 2) [segment adjusters](#).

This Methodology note is organized as follows: Section 1 outlines the company selection methodology; Section 2 describes the types of finance included in the study; Section 3 details the methodology used to calculate the financing contributions where these were not provided; finally, Section 4 provides details on how the segment activities of companies was analysed to adjust the financing contributions to more accurately reflect the value of financing directed towards the four focus forest-risk sectors – palm oil, pulp & paper, rubber and timber.

1 Company selection methodology

The focus of the research is companies engaged in the upstream exploitation of four forest-risk commodities: palm oil, pulp & paper, rubber and timber in Southeast Asia, with a particular focus on Indonesia. Companies were therefore selected if they had upstream forest-risk commodity exploitation activities in Southeast Asia.

Palm oil companies were selected on the basis of their planted area. Information on planted areas was garnered from companies' publications and websites, trade journals, as well as the Indonesian Industrial Forest register (*hutan tanaman industri* (HTI)). The following companies engaged in palm oil were included in the study:

- Albukhary Group
- Anglo-Eastern Group
- Artha Graha Group
- Asian Plantations Group
- Austindo Group
- Bakrie Group
- Barito Pacific Group
- Batu Kawan Group
- BHR Group

- BLD Group
- Bolloré
- Boon Siew Group
- Boustead Group
- Carson Cumberbatch Group
- Cepatwawasan Group
- Chin Teck Group
- Darmex Agro Group
- Djarum Group
- DSN Group
- DutaLand Group
- Felda Group
- Genting Group
- Global Palm Resource Holdings
- Golden Land Group
- Gozco Group
- Hap Seng Group
- Harita Group
- IJM Group
- Innoprise Group
- IOI Group
- Izzisen Global
- Jardine Matheson Group
- Java
- Jaya Holdings
- Johor Group
- Kencana Agri Group
- Kim Loong Group
- Korindo
- Kretam Group
- Kwantas Group
- Lam Soon
- Medco Group
- Merbau Jaya Indah Raya
- MP Evans
- Musim Mas Group
- Noble Group
- NPC Resources Group
- Olam Group
- Perkebunan Nusantara Group
- POSCO
- Provident Agro Group
- Puncak Niaga Holdings
- QL Resources
- R E A Holdings
- Rajawali Group
- Rimbunan Hijau Group
- Royal Golden Eagle Group
- Salim Group
- Samling Group
- Sampoerna Agro (Sampoerna Group)
- Sarawak Oil Palms
- Sarawak Plantation Group
- Sime Darby Group
- Sinar Mas Group
- Sipef
- Socfin
- Sungai Budi Group
- Surya Dumai Group
- Ta Ann Group
- Tadmax Group
- Tanah Makmur Group
- Tanjung Lingga Group
- TDM
- TH Group
- Tiga Pilar Sejahtera Group
- Triputra Group
- Tsani Hutani Abadi
- TSH Group
- United International Enterprises
- United Malacca Group
- United Plantations
- Univanich Palm Oil
- Wah Seong Group
- Wilmar Group
- WTK Group

Pulp & paper companies were selected on the basis of their concession size. Information on concession size was garnered from companies' publications and websites, trade journals, as well as the Indonesian Industrial Forest register (*Hutan Tanaman Industri* (HTI)) and the Forest Concession register (*Hak Pengusahaan Hutan* (HPH)). The following pulp & paper companies were included in the study:

- Sinar Mas Group
- Royal Golden Eagle Group
- Marubeni
- Djarum Group
- Nusantara Energi
- Inhutani III
- International Timber Corporation Indonesia
- Alas Kusuma Group
- Industrial Forest Plantation
- Kertas Basuki Rachmat Indonesia
- Korindo
- Prabowo Subianto
- Inhutani II
- Panca Eka Group
- Sentosa Bahagia Bersama
- ADR Group
- Garuda Kalimantan Lestari
- Timur Djaja Group
- Bumi Raya Group
- Green Garden Group
- Indoco Group
- Rimba Hutani Lestari
- Inhutani I
- Oji Group

Rubber companies were selected on the basis of their concession size. Information on concession areas was garnered from companies' publications and websites, trade journals, as well as the Indonesian Industrial Forest register (*Hutan Tanaman Industri* (HTI)) and the Forest Concession register (*Hak Pengusahaan Hutan* (HPH)). The following rubber companies were included in the study:

- Barito Pacific Group
- Batanghari Group
- Batu Kawan Group
- Bolloré
- BSS Group
- Felda Group
- Hainan State Farms
- Harum Group
- Hijau Artha Nusa
- Hoang Anh Gia Lai Group
- Incasi Raya
- Indokaret
- Itochu
- Lee Rubber
- Perkebunan Nusantara Group
- Silva Lampung Abadi
- Sinochem Group
- Sipef
- Socfin
- Southland Holding
- Sri Trang Group
- Sumitomo Rubber Industries
- Thai Eastern Group
- Thai Hua Rubber
- Tong Thai Rubber
- Top Glove
- Triputra Group
- Vietnam Rubber Group
- Von Bundit

Timber companies were selected on the basis of their concession size. Information on concession areas was garnered from companies publications and websites, trade journals, as well as the Indonesian Industrial Forest register (*Hutan Tanaman Industri* (HTI)) and the Forest Concession register (*Hak Pengusahaan Hutan* (HPH)). The following timber companies were included in the study:

- ADR Group
- Alas Kusuma Group
- Algro Group
- Andalas Group
- Artha Graha Group
- Asa Karya Group
- Barito Pacific Group
- Barito Pacific Group
- Batasan Group
- Benua Indah Group
- Bina Benua Group
- Bina Kayu Lestari Goup
- BMI Group
- Bolloré
- Bumi Raya Utama Group
- Bumi Teknokultura Unggul Tbk (BTEK)
- CBI Group
- Darma Putera Wahana Pratama (DEWATA) Group
- Daya Tani Kalbar
- Dharmarosa Group
- Diva Perdana
- Djarum Group
- Djayanti Group
- Dwima Group
- Evergreen Fibreboard
- Georgia-Pacific Group (Koch Industries)
- GPS Group
- Hanurata Group
- Hasnur Group
- Hendratna Group
- Hutanindo Group
- Inhutani I
- Integra Group
- International Timber Corporation Indonesia
- Intracawood
- Izzisen Global
- Kandelia Group
- Karunia Hutan Lestari Group
- Katingan Timber Group
- Kawedar Group
- Kayu Lapis Indonesia (PT KLI)
- Kayu Mas Group
- Kodeco Group
- Korindo
- Lyman Group
- Mega Masindo Group
- Mujur Timber Group
- Nusantara Energi
- Oceanias Timber Product
- Olam Group
- Omega Prima Utama/KTC Group
- Pacific Fiber Indonesia
- Poleko Group
- PT Tansa Trisna/ Far East Delta
- Rante Marion Huntuss Group
- Rimba Raya Lestari
- Rimbunan Hijau Group
- Roda Mas Group
- Salim Group
- Samko Timber Group (Sampoerna Group)
- Samling Group
- Sele Raya Group

- Shin Yang Holding
- Siak Raya Group
- Sinar Wijaya Group
- SLJ Global Tbk
- Sumalindo Group
- Sumatera Timber Utama Damai (PT STUD)
- Sumber Mas Group
- Sumber Mitra Jaya (SMJ) Group
- Sumitomo Forestry
- Ta Ann Group
- Tadmax Group
- Tanjung Lingga Group
- Tanjung Raya Plywood
- Teluk Nauli Group
- Tirta Mahakam Resources
- Tirta Mahakam Resources
- Triputra Group
- Uniseraya Group
- Wah Seong Group
- Waroeng Batok Industri
- WTK Group

The selection above shows that a number of companies are active in more than one of the focus forest-risk commodities. Section 4 details how the segment activities of companies was analysed to adjust the financing contributions to more accurately reflect the value of financing directed towards the four focus forest-risk sectors.

2 Types of finance

This section describes the types of finance included in the research. Financial institutions can invest in companies through a number of modalities. Financial institutions can provide credit to a company. This includes providing loans and the underwriting of share and bond issuances. Financial institutions can also invest in the equity and debt of a company by holding shares and bonds. This section outlines the different types of financing, how they were researched and the implications for the study.

2.1 Corporate loans

The easiest way to obtain debt is to borrow money. In most cases, money is borrowed from commercial banks. Loans can be either short-term or long-term in nature. Short-term loans (including trade credits, current accounts, leasing agreements, et cetera) have a maturity of less than a year. They are mostly used as working capital for day-to-day operations. Short-term debts are often provided by a single commercial bank, which does not ask for substantial guarantees from the company.

A long-term loan has a maturity of at least one year, but generally of three to ten years. Long-term corporate loans are in particular useful to finance expansion plans, which only generate rewards after some period of time. The proceeds of corporate loans can be used for all activities of the company. Often long-term loans are extended by a loan syndicate, which is a group of banks brought together by one or more arranging banks. The loan syndicate will only undersign the loan agreement if the company can provide certain guarantees that interest and repayments on the loan will be fulfilled.

2.1.1 Project finance

One specific form of corporate loan is project finance. This is a loan that is earmarked for a specific project.

2.1.2 General corporate purposes / working capital

Often a company will receive a loan for general corporate purposes or for working capital. On occasion while the use of proceeds is reported as general corporate purposes, it is in fact earmarked for a certain project. This is difficult to ascertain.

2.2 Share issuances

Issuing shares on the stock exchange gives a company the opportunity to increase its equity by attracting a large number of new shareholders or increase the equity from its existing shareholders.

When a company offers its shares on the stock exchange for first time, this is called an Initial Public Offering (IPO). When a company's shares are already traded on the stock exchange, this is called a secondary offering of additional shares.

To arrange an IPO or a secondary offering, a company needs the assistance of one or more (investment) banks, which will promote the shares and find shareholders. The role of investment banks in this process therefore is very important.

The role of the investment bank is temporary. The investment bank purchases the shares initially and then promotes the shares and finds shareholders. When all issued shares that the financial institution has underwritten are sold, they are no longer included in the balance sheet or the portfolio of the financial institution. However, the assistance provided by financial institutions to companies in share issuances is crucial. They provide the company with access to capital markets, and provide a guarantee that shares will be bought at a pre-determined minimum price.

2.3 Bond issuances

Issuing bonds can best be described as cutting a large loan into small pieces, and selling each piece separately. Bonds are issued on a large scale by governments, but also by corporations. Like shares, bonds are traded on the stock exchange. To issue bonds, a company needs the assistance of one or more (investment) banks which underwrite a certain amount of the bonds. Underwriting is in effect buying with the intention of selling to investors. Still, in case the investment bank fails to sell all bonds it has underwritten, it will end up owning the bonds.

2.4 (Managing) shareholdings

Banks can, through the funds they are managing, buy shares of a certain company making them part-owners of the company. This gives the bank a direct influence on the company's strategy. The magnitude of this influence depends on the size of the shareholding.

As financial institutions actively decide in which sectors and companies to invest, and are able to influence the company's business strategy, this research will investigate the shareholdings of financial institutions of the selected companies. Shareholdings are only relevant for stock listed companies. Not all companies in the study are listed on a stock exchange. The company selection has tried to take this into account by including the major companies in the relevant sectors. However, some ownership forms may dominate in certain sectors under analysis. Additionally, some ownership forms are more prominent in some countries.

Shareholdings have a number of peculiarities that have implications for the research strategy. Firstly, shares can be bought and sold on the stock exchange from one moment to the next. Financial databases keep track of shareholdings through snapshots, or filings. This means that when a particular shareholding is recorded in the financial database, the actual holding, or a portion of it, might have been sold, or more shares purchased. Secondly, share prices vary from one moment to the next.

2.5 (Managing) investments in bonds

Banks can also buy bonds of a certain company. The main difference between owning shares and bonds is that owner of a bond is not a co-owner of the issuing company; the owner is a creditor of the company. The buyer of each bond is entitled to repayment after a certain number of years, and to a certain interest during each of these years.

3 Financial institution financing contributions

During the financial data collection process, this research utilized financial databases (Bloomberg, Thomson ONE Banker, Thomson EIKON, TradeFinanceAnalytics, and IJGlobal), company reports (annual, interim, quarterly) and other company publications, company register filings, as well as media and analyst reports. Financial databases often record loans and issuance underwriting when these are provided by a syndicate of financial institutions. Company reports and publications, company register filings, and the media will also provide information on loans provided bilaterally, i.e. between one bank and the company in question. The level of detail per deal often varies. Some sources may omit the maturity date or term of the loan, the use of proceeds, or even the exact issue date. Financial databases often do not report on the proportions of a given deal that can be attributed to the participants in deal. In such instances, this research calculated an estimated contribution based on the rules of thumb described below.

3.1 Loans and underwriting

Individual bank contributions to syndicated loans and underwriting were recorded to the largest extent possible where these details were included in financial database, or company or media publications.

In many cases, the total value of a loan or issuance is known and also the banks that participate in this loan or issuance. However, often the amount that each individual bank commits to the loan or issuance has to be estimated. The bookratio (see formula below) is used to determine the spread over bookrunners and other managers.

$$\text{Bookratio: } \frac{\text{number of participants} - \text{number of bookrunners}}{\text{number of bookrunners}}$$

Table 1 shows the commitment assigned to bookrunner groups with our estimation method. When the number of total participants in relation to the number of bookrunners increases, the share that is attributed to bookrunners decreases. This prevents very large differences in amounts attributed to bookrunners and other participants.

Table 1 Commitment to assigned bookrunner groups

Bookratio	Loans	Issuances
> 1/3	75%	75%
> 2/3	60%	75%
> 1.5	40%	75%
> 3.0	< 40%*	< 75%*

* In case of deals with a bookratio of more than 3.0, we use a formula which gradually lowers the commitment assigned to the bookrunners as the bookratio increases. The formula used for this:

$$\frac{1}{\frac{\sqrt{\text{bookratio}}}{1.443375673}}$$

The number in the denominator is used to let the formula start at 40% in case of a bookratio of 3.0. As the bookratio increases the formula will go down from 40%. In case of issuances the number in the denominator is 0.769800358.

Forests & Finance can present the underlying deals dataset for verification of deals and contributions when requested. This dataset includes data sources and dates of access.

3.2 Shareholding

The number and values of shares held by financial institutions are reported in financial databases, they were not subject to adjustment.

3.3 Bondholding

The number and values of bonds held by financial institutions are reported in financial databases, they were not subject to adjustment.

4 Segment adjusters

This section explains the methodology by which segment adjusters for the four forest-risk supply chains in the scope of the Forests & Finance research project were calculated and applied. The section outlines the four supply chains, presents examples of segment reporting by a number of key companies in each supply chain, and explains the reasoning behind the adjusters that were utilized for the forestsandfinance.org database.

Segment adjusters were developed for all companies and every year for which financing was identified. As illustrated below, it is not possible to consistently breakdown the supply chains of the analysed companies into up-, mid- and downstream segments. This research therefore developed sector adjusters for whole supply chains, with the understanding that the impact of upstream operations (potential deforestation and human rights issues) is driven by the demand from the mid- and downstream segments.

These segment adjusters were not applied to project finance. When project finance was identified, this research investigated the purpose of the identified project finance to determine whether or not it fell within the scope of this research, and how to attribute it, e.g. as palm oil or pulp & paper. When there was insufficient detail, project finance was treated with the segment adjuster. When the identified financing had multiple use of proceeds, the deal was treated as financing for general corporate purposes.

This section is organized as follow: sub-section 4.1 presents the analyses of the palm oil supply chain; sub-section 4.2 is on the pulp & paper supply chain; sub-section 4.3 focuses on rubber; while sub-section 4.4 analyses the timber supply chain; sub-section 4.5 will summarize how sectors are defined as applied to this research and which financial indicators are used to calculate proportions of a company's activities engaged in the sectors in question; finally, sub-section 4.6 will present an example of how a sector adjuster is calculated and applied to an identified deal.

4.1 Palm oil

This sub-section presents the palm oil supply chain, the type of companies involved in the palm oil supply chain, and their segment reporting in company filings. The sub-section is organized as follows: section 4.1.1 will outline the palm oil supply chain. Section 4.1.2 will describe the kind of companies involved at the various stages of the palm oil supply chain. Section 4.1.3 will present extracts and analyses of segment information relevant for developing segment adjusters from company filings. Finally, section 4.1.4 will summarize the findings of the analyses.

4.1.1 Supply chain

Palm oil (PO) and palm kernel oil (PKO) are edible oils extracted from the fruits of oil palms. PO and PKO are used as inputs for both food and non-food products. This includes everything from cooking oil and margarine to cosmetics and biofuels. Figure 1 provides a simplified overview of the palm oil supply chain.

Three distinct segments can be identified in the PO & PKO supply chain:

- **Upstream**

This is composed of plantations and mills. Harvested fresh fruit bunches (FFB) have to be milled within 24 hours to extract the crude palm oil (CPO).

- **Midstream**

The midstream segment of the palm oil supply chain is the refining stage. At this stage CPO is refined to remove colour, odour and flavour. The resulting oils are known as RBD (refined, bleached, and deodorized) palm oils and its variants (e.g. RBD palm stearin, RBD palm olein).

- **Downstream**

The downstream segment is composed of the manufacturing stages. This includes the preparation of refined oils as inputs for both food and non-food uses, as well as the manufacturing of the final product.

Figure 1 Palm oil supply chain



Source: Zoological Society of London (n.d.), "Sustainable palm oil transparency toolkit: Infographics", online: <http://www.sustainablepalmoil.org/infographics/>, viewed in February 2017.

4.1.2 Palm oil companies

A broad variety of companies operate in the palm oil sector. They operate at various stages of the supply chain.

- **Upstream**

Companies active at this stage are plantation companies, smallholders, and companies that operate mills. Generally, only medium to large enterprises operate mills as these are capital intensive.

Anglo-Eastern Plantations is an example of a company that operates both plantations and mills, but do not operate further down the supply chain.

Citalaras Cipta Indonesia is a plantation company. It does not operate any mills, however, it transports its FFBS to related companies within the Bakrie Sumatera Plantations group for milling.

- **Midstream**

Companies active in the refinery stage include integrated palm oil companies such as IOI. Trading companies, such as Louis Dreyfus Company, also frequently operate refineries but do not necessarily manage plantations and/or mills.

- **Downstream**

Downstream companies are more varied. They include integrated companies with direct links to palm oil refining and/or further upstream activities such as Wilmar, Golden Agri-Resources, and First Pacific. These companies also market palm oil based products such as cooking oils, instant noodles, and margarine, often in addition to other products with no direct links to the PO supply chain.

Downstream companies also include consumer brand product (CBP) retailers such as Unilever and PepsiCo. These companies source palm oil and its derivatives from integrated PO companies such Wilmar and Musim Mas, or from traders such as Cargill and Archer Daniels Midland. These CBP retailers are not directly involved in the upstream or midstream segments of the palm oil supply chain.

As mentioned above, the majority of large companies engaged in palm oil are active in various stages of the PO supply chain. A number of the largest PO companies are actually active throughout the PO supply chain, such as Wilmar and First Pacific.

4.1.3 Segment reporting in company filings

This section will present the segment reporting of two companies engaged at various stages in the palm oil supply chain. The companies differ in size, have activities in Indonesia and Malaysia. Both companies are listed on the stock exchange. The two companies that will be presented are the following:

- IOI
- Sarawak Oil Palms

- **IOI**

IOI has two reportable operating segments. These are: Plantation and Resource-based manufacturing. It defines these as follow:

- Plantation
Cultivation of oil palm and rubber and processing of palm oil.
- Resource-based manufacturing
Manufacturing of oleochemicals, specialty oils and fats, palm oil refinery and palm kernel crushing.¹

As such, IOI can be considered a completely vertically integrated palm oil company with activities in the upstream, midstream and downstream segments (see section 4.1.1). However, its segment reporting only distinguishes the upstream (plantations) on the hand, and combines midstream and downstream in Resource-based manufacturing on the other hand. This includes palm oil refinery and palm kernel crushing (midstream) and the manufacturing of oleochemicals, specialty oils and fats (downstream).² See Figure 2 for details.

A further, though slight, complication, is the plantation segments covers both palm oil and rubber. However, the annual report includes planted area data broken down crop type.

Figure 2 IOI Group segment reporting (2016)

<i>In RM million</i>	Plantation	Resource-based manufacturing	Other operations	Total
2016				
Revenue				
Segment revenue	1,946.9	11,551.3	20.9	13,519.1
Result				
Operating profit	763.9	590.2	4.3	1,358.4
Share of results of associates	78.3	21.4	–	99.7
Share of results of joint ventures	–	(5.2)	–	(5.2)
Segment results	842.2	606.4	4.3	1,452.9
Assets				
Operating assets	7,979.9	6,611.9	141.6	14,733.4
Interest in associates	744.6	192.9	–	937.5
Interest in joint ventures	–	31.7	–	31.7
Segment assets	8,724.5	6,836.5	141.6	15,702.6
Liabilities				
Segment liabilities	337.5	1,039.4	21.4	1,398.3
Other information				
Capital expenditure	217.0	264.2	0.5	481.7
Depreciation and amortisation	272.0	187.4	0.3	459.7
Non-cash items other than depreciation and amortisation	12.0	159.6	37.8	209.4

Source: IOI Group (2016, September), *Strength in Fundamentals: Annual Report 2016*, p. 250.

In developing segment adjusters, the preference is to use segment capital expenditures as these more accurately reflect the investments of companies, and can be included in company filings. Capital expenditures (capex) are the money spent by a business for acquiring or maintaining fixed assets, such as land, buildings, and equipment. In 2016, approximately 45% of IOI's capital expenditures were in the Plantation segment, compared to 55% in the Resource-based manufacturing segment. However, it should be emphasized that segment breakdowns of capital expenditures are not always included in publicly available company filings.

Segment breakdowns of companies' assets are more commonly included in company reports, though not always. In 2016, approximately 56% of IOI's assets were in the Plantation segment, compared to 44% in the Resource-based manufacturing segment.

While capital expenditure is sometimes included in company filings, segmentation of revenues is more often provided. In 2016, only 14% of IOI's revenues were derived from the Plantation segment. This compares with 85% from Resource-based manufacturing.

Adjuster calculation as in Forestsanfinance.org dataset

As mentioned above, IOI has three reportable operating segments: Plantation; Resource-based Manufacturing, and; Other operations. The palm oil adjuster is based on the Plantation and Resource-based Manufacturing segments. The Plantation segment is adjusted for the proportion of palm oil in the planted area of the company. The rubber adjuster is based on the proportion of the rubber planted area within the Plantation segment. Segment capital expenditure was used.

The palm oil adjuster for 2016 was based on the following calculation:
$$= ((217 * (179271 / (180322))) + 264.2) / (217 + 264.2 + 0.5) = 99.63\%$$

Where 179,271 is the palm oil planted area, and 180,322 is the total planted area.

The rubber adjuster for 2016 was based on the following calculation:

$$= ((217 * (470 / (180322)))) / (217 + 264.2 + 0.5) = 0.12\%$$

Where 470 is the rubber planted area, and 180,322 is the total planted area. ³

- **Sarawak Oil Palms**

Sarawak Oil Palms (SOP) has two reportable operating segments. These are:

- Oil palm
- Property development.⁴

SOP does not define these segments in their annual report. The company website has more detail. It defines the Property development segment as "It focuses on building quality homes with innovative design."⁵

However, the website also presents four other segments which all fall under Oil palm in the annual report segmentation. These four segments are Plantation, Milling, Downstream, and Marketing & Trading. ⁶ A further look at the Downstream segment shows that this refers to the Physical Refinery and Fractionation Plant.⁷ In reference to the palm oil supply chain segmentation described in section 4.1.1, this would indicate that SOP is active in the upstream and midstream segments. However, the annual report does not differentiate between these segments, or marketing and trading, as these are all included under the Oil palm segmentation in the annual report.

Figure 3 Sarawak Oil Palms segment reporting (2015)

	Oil Palm		Property development		Adjustments and eliminations		Notes	Per consolidated financial statements	
	2015 RM'000	2014 RM'000	2015 RM'000	2014 RM'000	2015 RM'000	2014 RM'000		2015 RM'000	2014 RM
Revenue:									
External customers	3,661,087	2,874,718	9,700	-	-	-		3,670,787	2,874,718
Inter-segment	2,170,065	1,397,790	-	-	(2,170,065)	(1,397,790)	A	-	-
Total revenue	5,831,152	4,272,508	9,700	-	(2,170,065)	(1,397,790)		3,670,787	2,874,718
Results:									
Interest income	34,084	31,431	51	-	(20,866)	(17,302)		13,269	14,129
Depreciation and amortisation	104,929	91,308	310	-	2,881	2,737		108,120	94,045
Fair value (gain)/loss on derivatives	(6,582)	8,182	-	-	-	-		(6,582)	8,182
Other non-cash expenses	2,588	2,338	6	-	-	-	B	2,594	2,338
Segment (loss)/profit	146,826	170,002	(167)	-	(22,897)	(9,866)	C	123,762	160,136
Assets:									
Investment in an associate	9,854	8,554	50	-	177	(351)		10,081	8,203
Additions to non-current assets	118,431	179,230	484	-	(281)	(1,550)	D	118,634	177,680
Segment assets	3,725,544	3,266,189	69,720	-	(764,851)	(546,262)	E	3,030,413	2,719,927
Segment liabilities	2,253,898	1,927,357	69,721	-	(793,074)	(636,336)	F	1,530,545	1,291,021

Source: Sarawak Oil Palms (2016, June), *2015 Annual Report: Building a Sustainable Future*, p. 136.

SOP provides segment breakdowns on a number of financial indicators. In development segment adjusters the preference is to use segment capital expenditures as these more accurately reflect the investments of companies, and can be included company filings. In the case of SOP capital expenditures are termed 'additions to non-current assets'. In 2015 almost 100% of SOP's additions to non-current assets were in the palm oil sector.

As noted above, it should be emphasized that segment breakdowns of capital expenditures are not always included in publicly available company filings. Segmentation of assets is more commonly found in company reports. In 2015, excluding adjustments and eliminations (which are not broken down by segment), approximately 53% of SOPs assets were in the Oil palm segment, compared to 47% in the Property development segment.

As mentioned above, while asset segmentation is sometimes included in company filings, segmentation of revenues is more often provided. In 2015, excluding adjustments and eliminations (which are not broken down by segment), approximately 58% of SOPs revenues were derived from the Oil palm segment, compared to 42% from the Property development segment.

Adjuster calculation as in Forestsanfinance.org dataset

As mentioned above, SOP has two reportable operating segments: Oil Palm and Property Development. The palm oil adjuster is, therefore, based on the Oil Palm segment. Segment capital expenditures were used.

The palm oil adjuster for 2015 was based on the following calculation:

$$=118431/118634 = 99.83\% ^8$$

4.1.4 Summary

The analysis of segment reporting of the two palm oil companies above has highlighted a number of issues. Firstly, there are significant inconsistencies in reporting. While for many companies it is possible to separate upstream from midstream and downstream, this can sometimes lead to strange results, and is not always consistent. It seems to be more difficult to separate midstream and downstream.

Additionally, some companies segment their capital expenditures, which is the best estimator to use for the development of segment adjusters. However, this is less common. More companies provide a segmentation of their assets. However, not all do. Some only provide a segmentation of their revenues, or in the worst case a segmentation of their profits. Both of these financial indicators are subject to too many externalities. Moreover, for integrated companies, such as IOI this can create a distorted picture. E.g. 14% of IOI's revenues were generated from the Plantation segment, while approximately 56% of its assets were in the Plantation segment.

4.2 Pulp & paper

This sub-section presents the pulp & paper supply chain, the type of companies involved in the pulp & paper supply chain, and their segment reporting in company filings. The sub-section is organized as follows: section 4.2.1 will outline the pulp & paper supply chain. Section 4.2.2 will describe the kind of companies involved at the various stages of the pulp & paper supply chain. Section 4.2.3 will present extracts and analyses of segment information relevant for developing segment adjusters from company filings. Finally, section 4.2.4 will summarize the findings of the analyses.

4.2.1 Supply chain

Most people have an idea of what the pulp & paper supply chain looks like. It was often taught in schools in a slightly simplified way. Figure 4 serves to add detail to this understanding.

As Figure 4 shows, three distinct segmented can be defined in the pulp & paper supply chain. These are:

- **Upstream**

This stage includes the forest or concession area.

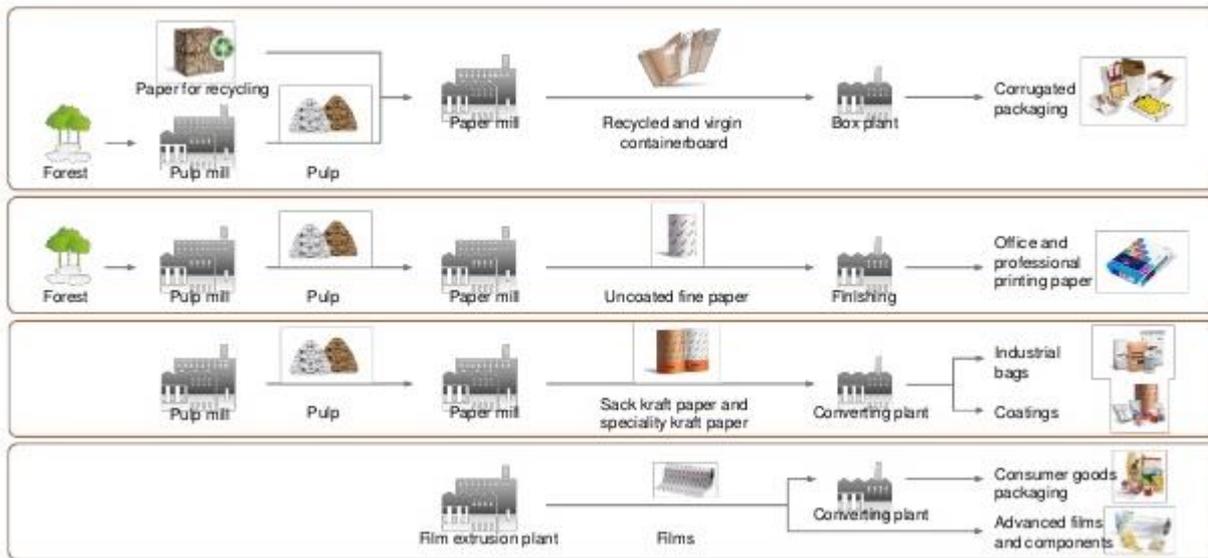
- **Midstream**

This stages includes the pulp mill, the paper mill and the film extrusion plant, which produce, among others: pulp, recycled and virgin containerboard; uncoated fine paper; sack kraft paper and specialty kraft paper, and; film.

- **Downstream**

This stages includes further processing at box plants, finishing plants and converting plants. These plants produce, among others: corrugated packaging; office and professional printing paper; industrial bags; coatings; consumer goods packaging, and; advanced films and components.

Figure 4 Pulp & paper supply chain



Source: Mondi (2014, April), "Integrated value chain", online: <https://image.slidesharecdn.com/eipresentationfy2013-140424085618-phpapp01/95/mondi-ei-company-presentation-april-2014-15-638.jpg?cb=1398330005>, viewed in February 2017.

Note that the first stage of processing in the pulp & paper supply chain, i.e. the pulp mill, is not included in the upstream segment. This is for three reasons. Firstly, in contrast to the palm oil sector, processing after harvesting does not have to occur within a limited period of time (24 hours for harvest FFB – see section 4.1.1). Secondly, related to this, pulp mills can be located further away from the areas where wood is harvested. Finally, plants with pulp mills can also include an integrated paper mill, i.e. pulp & paper mills.

4.2.2 Pulp & paper companies

A variety of companies operate in the pulp & paper sector. They operate at various stages of the supply chain. The pulp & paper sector is more capital intensive upstream when compared to other commodity chains such as palm oil, rubber or soy for example. This is because of the nature of pulp tree concessions. A larger area of land is needed, because trees are harvested from one area, which is then replanted, and can only be harvested again a few years later when the trees have matured to a sufficient size. As such, there are no smallholder suppliers to pulp mills, and fewer smaller enterprises supplying pulp mills than in the palm oil sector for example.

For these reasons, many companies engaged in the pulp & paper sector tend to be integrated, either fully integrated, or integrated at two of the three stages of the supply chain. For example, the upstream and midstream may be integrated, or the mid- and downstream segments may be integrated. The latter is a more common than the former.

Below are descriptions of companies operating at the various stages of the pulp & paper supply chain, bearing in mind that most companies operating in this sector are integrated in at least two of the three segments:

- **Upstream**

Companies operating at this stage are plantation or concession companies, also sometimes referred to as forest management companies or industrial timber estates. They include subsidiaries of larger integrated companies, such as Musi Hutan Persada, the subsidiary of Marubeni, and Sumalindo Hutani Jaya the subsidiary of Tjiwi Kimia (part of Sinar Mas' Asia Pulp & Paper (APP) brand).

Upstream companies can also include smaller forest management companies which supply to larger integrated companies. These include, for example, Artelindo Wiratama which is a supplier of Sinar Mas' APP brand producers, and Alas Kusuma Group, which in addition to manufacturing its own timber products is also a supplier of Royal Golden Eagle Group's Asia Pacific Resources International Limited (APRIL).

- **Midstream**

Companies operating at this stage include pulp mill, paper mill and integrated pulp & paper mill operators. Examples include pulp mill operator Tanjungenim Lestari Pulp & Paper, supplied by Musi Hutan Persada both subsidiaries of Marubeni; and Riau Andalan Pulp & Paper (integrated pulp & paper mill) which is a subsidiary of Royal Golden Eagle Group's Asia Pacific Resources International Limited (APRIL).

- **Downstream**

Companies operating in the downstream segment include both original equipment manufacturers (OEM) and branded products manufacturers producing. This includes vertically integrated companies such as APP and APRIL which produce both OEM and branded products. It also includes companies such as International Paper, which also produces both OEM and branded products. It operates papers mill, but does not operate its own industrial timber estates or primary pulp mills.

4.2.3 Segment reporting in company filings

This section will present the segment reporting of two companies engaged at various stages in the pulp & paper supply chain. The companies differ in size, have activities in Indonesia and are headquartered in either Indonesia or Japan. Both companies are listed on the stock exchange, one company (APP) is not listed on the stock exchange but has listed subsidiaries, one of which will be presented here. The companies that will be presented are the following:

- Asia Pulp & Paper (APP) - Indah Kiat Pulp & Paper
- Marubeni

- **Asia Pulp & Paper (APP)**

This section will present the segment reporting of one of APP's listed subsidiaries Indah Kiat Pulp & Paper. APP itself is member of the Sinar Mas group – a multi-sector conglomerate.

- Indah Kiat Pulp & Paper

Indah Kiat operates in two business segments:

- Paper and pulp products

This segment consists primarily of paper and other related paper products and pulp.

- Packaging products

This segment consists primarily of linerboard, corrugating medium, corrugated shipping containers and boxboard. The segment also includes the sale of chemical by products, which are not significant.⁹

It is evident that the company operates in the mid- and downstream segments. Its pulp mills are likely supplied by affiliate companies in the Sinar Mas and APP groups, other small industrial timber companies, or companies operating in the timber or furniture sectors that sell woodchips and other wood waste to pulp mills. Indah Kiat's Paper and pulp products segment includes both midstream and downstream activities. Midstream as it supplies the materials used in the Packaging product segment (which is purely a downstream segment). However, the Paper and pulp products segment also supplies inputs for its own downstream finished paper products.

Figure 5 Indah Kiat Pulp & Paper segment reporting (2015)

2015	2014	
		<i>Export sales by region</i>
		<i>Export sales were made to the following regions:</i>
		Asia
		Middle East
		America
		Europe
		Africa
		Australia
		Total Export Sales
		<i>Information based on type of product</i>
		<i>Net sales</i>
		Paper and pulp
		Packaging products and others
		Consolidated Net Sales
		<i>Cost of goods sold</i>
		Paper and pulp
		Packaging products and others
		Consolidated Cost of Goods Sold
		<i>Income from operations</i>
		Paper and pulp
		Packaging products and others
		Consolidated Income from Operations
		Percentage of total assets and liabilities
		Paper and pulp
		Packaging products and others
		Total
1.007.240	975.398	
141.844	116.289	
110.013	132.908	
91.325	102.230	
69.589	78.845	
7.832	7.181	
1.427.843	1.412.851	
1.952.861	1.765.433	
881.417	869.604	
2.834.278	2.635.037	
1.411.860	1.396.146	
812.430	785.106	
2.224.290	2.181.252	
324.910	172.102	
2.231	20.276	
327.141	192.378	
83	83	
17	17	
100	100	

Source: Indah Kiat Pulp & Paper (2016, June), 2015 Annual Report, p. FS-88.

As is apparent from Figure 5, 100% of Indah Kiat's revenues are generated from and assets are composed of these two segments. However, it is not possible to differentiate between the mid- and downstream activities in the Paper and pulp products segment.

Of note is that Indah Kiat describes itself in its annual report as "[o]ne of the world's largest vertically integrated pulp and paper company."¹⁰ This would imply that it potentially also has upstream operations in industrial timber estates supply its own mills.

Adjuster calculation as in Forestsanfinance.org dataset

As mentioned above, the annual report states: "The company operates in two (2) business segments i.e. paper & pulp products and packaging products" Therefore, pulp & paper is set at 100%.¹¹

- **Marubeni**

Marubeni is a large international conglomerate. It is active in five operating segments – it calls these groups. Within each segment Marubeni is active in more defined sectors – which it also refers to as divisions. The operating segments and sectors are as follows:

- Food & Consumer Products

The *Foods sector* produces and distributes all sorts of foods such as fodder, soy beans, grain, sugar, processed food and beverages, raw materials, foodstuffs for commercial use, and agricultural and marine products. The *Lifestyle sector* includes apparel, footwear, household goods and home furnishings, sporting goods, and tires, and operates various businesses from planning, manufacturing, importing, and wholesaling of products to brand development, consulting services and business investment. The *Communication sector* is involved in the system integration business, the data communication network business, the mobile devices sales business. The *Logistics sector* operates forwarding business and logistics centres, and the Insurance sector operates an insurance brokerage business, a reinsurance business and other related businesses. The *Finance sector* operates asset and property managements, fund operations and other businesses, while the Real estate development sector deals with condominium development and other broad range businesses to provide various services.

- Chemical & Forest Products

The *Chemical sector* handles a wide variety of goods ranging from upstream, such as basic petrochemicals, to downstream, such as electronic materials, specialty chemicals, agrochemicals and fertilizers. Focusing on China, the Americas, Middle East, South East Asia and India, as priority markets, this sector is conducting business with a balance between investment and trade. For the agriculture material sales operation in the U.S., which acts as the platform of our agriculture related business, the Company has made *Helena Business* independent from the main sector, as a newly established sector, in order to further increase the earnings profit of Helena Chemical Company. The *Forest Products sector* manufactures and distributes raw materials for paper production, paper and cardboard, and takes part in afforestation projects and sells housing materials.

- Energy & Metals

The *Energy sector*, which focuses on products related to energy such as oil, gas and etc., takes part in various sorts of businesses which benefit from the development of resources through retail channels such as gas stations. The *Metals and Mineral Resources* sector is engaged in the development business for raw materials for production of steel and iron and nonferrous light metals. Also, this sector processes and sells nonferrous light metals, and is engaged in trading of raw materials for steel and iron and nonferrous light metals, as well as producing, processing and selling steel products in general including steel plates, steel pipes, and special steels.

- Power Projects & Plant

This segment develops, invests in, operates and manages a variety of power projects including power generating, distributing and transforming operations, energy related infrastructure operations, desalination and water treatment operations, traffic and infra-system operations and various fields of industrial plants. In addition, this segment also delivers and contracts works of related equipment.

- Transportation & Industrial Machinery

This segment focuses on domestic and international trade (export and import) in aerospace and defense systems, automotive, construction, agricultural machinery and other transportation-related machinery; loans and investments in wide-ranging fields such as wholesale, retail, retail finance, leasing business, product development and services related to such transportation machinery; and trading, possessing and chartering various cargo vessels, tankers and LNG carriers.¹²

Figure 6 Marubeni segment reporting (2016)

<i>Millions of yen</i>				
March 31, 2016	Food & Consumer Products	Chemical & Forest Products	Energy & Metals	Power Projects & Plant
Total volume of trading transactions:				
External customers	¥5,332,850	¥2,237,125	¥2,729,716	¥430,369
Inter-segment	66,477	110,293	59,756	2,050
Total	¥5,399,327	¥2,347,418	¥2,789,472	¥432,419
Gross trading profit	¥301,019	¥190,825	¥17,044	¥53,942
Share of profits (losses) of associates and joint ventures	¥10,514	¥3,364	¥(63,751)	¥66,941
Profit (loss) for the year attributable to owners of the parent	¥85,848	¥31,002	¥(143,964)	¥66,431
Segment assets	¥1,865,728	¥977,988	¥1,712,698	¥1,267,565

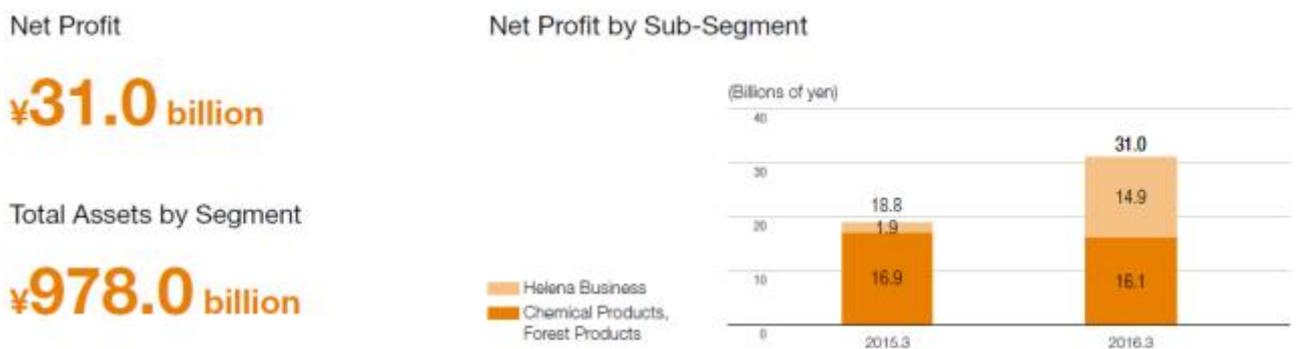
<i>Millions of yen</i>			
March 31, 2016	Transportation & Industrial Machinery	Corporate & Elimination, etc.	Consolidated
Total volume of trading transactions:			
External customers	¥891,953	¥585,944	¥12,207,957
Inter-segment	16,864	(255,440)	—
Total	¥908,817	¥330,504	¥12,207,957
Gross trading profit	¥98,392	¥8,864	¥670,086
Share of profits (losses) of associates and joint ventures	¥13,977	¥779	¥31,824
Profit (loss) for the year attributable to owners of the parent	¥23,843	¥29,104	¥62,264
Segment assets	¥799,191	¥494,516	¥7,117,686

Source: Marubeni (2016, December), *Annual Report 2016*, p. 161.

With regard to the sector of interest to this study, pulp & paper, it is apparent that Marubeni includes this in the Chemicals and Forest Products segment. However, the segment definition also includes an unrelated segment (Chemicals), and in the Forest Products sector, it includes afforestation products and housing materials. Figure 6 outlines Marubeni’s segmentation on the basis of a number of financial indicators. This indicators could potentially be useful in developing sector adjusters.

A closer look at the Chemicals and Forest Products segment performance review chapter provides further useful details. Here Marubeni states that “The strength of the Forest Products Division lies in its construction of a value chain that spreads from upstream to downstream areas to encompass afforestation and the manufacture and sale of wood chip, pulp, paper, and paperboard.” As such, this division seems to operate throughout all three segments of the pulp & paper supply chain. However, the performance reporting makes it difficult to attribute financial indicators specifically to the pulp & paper supply chain – as Figure 7 shows.

Figure 7 Marubeni Chemicals and Forest Products segment performance reporting (2016)



Major Subsidiaries and Associates

(Unit: billions of yen)

Company Name	Subsidiary / Associate	Equity Portion	FYE 3/2015 Actual	FYE 3/2016 Actual	Description of Business
Helena Chemical Company	Subsidiary	100.00%	20.1	19.5	Sales of agricultural materials and provision of various services
Marubeni Plax	Subsidiary	100.00%	0.5	0.3	Sales and foreign trade of plastic products and resins
Marubeni Chemix	Subsidiary	100.00%	0.7	0.6	Sales and foreign trade of organic chemicals and fine chemicals
Marubeni Pulp & Paper	Subsidiary	100.00%	1.7	1.5	Sales of Paper, Paperboard, Waste Paper, Flexible Packaging and Plastic Film
Koa Kogyo	Subsidiary	79.95%	0.2	0.4	Manufacture and sale of corrugating medium and printing paper

Source: Marubeni (2016, December), *Annual Report 2016*, p. 31.

Further investigation of Koa Kogyo, reveals that its operations are primarily downstream. Marubeni Pulp & Paper on the other hand, has operations throughout the value chain. It operates: forestry management estates in Australia, New Zealand and Indonesia (Musi Hutan Persada); pulp mills in Canada and Indonesia (Tanjungenim Lestari Pulp & Paper); paper and paperboard production facilities in Japan and Malaysia (GS Paper & Packaging – 75% owned by Oji and 25% by Marubeni); as well as sales, logistics and processing centres in Japan. Moreover, it is supplied not only by its own upstream and midstream companies, but also third party suppliers, including companies from Japan, Finland (UPM-Kymmene) and Singapore/Indonesia (Royal Golden Eagle Group’s APRIL – Asia Pacific Resources International Limited).¹³ Moreover, while the subsidiary (Marubeni Pulp & Paper) does provide details of its revenue, it doesn’t split this into the pulp & paper supply chains three different segments, it only gives one revenue figure. There is also no information regarding total assets or a breakdown of assets by supply chain segments.

Adjuster calculation as in Forestsanfinance.org dataset

As mentioned above, Marubeni has five reportable operating segments: Food & Consumer Products; Chemical & Forest Products; Energy & Metals, and; Transportation & Industrial Machinery. The Chemical & Forest Products segment is further broken into three sub-segments: Helena Business; Forest Products, and; Chemicals. The only sub-segment breakdown available is of net profit of Helena Business and combined Forest Products and Chemicals. Forest Products and Chemicals includes: pulp & paper; wood chips; and a range of chemical products. As there is no further breakdown, the pulp & paper and wood chips (timber) are each considered to be a third of total revenues attributable to Forest Products and Chemicals proportion. This is further a proportion of total revenues attributable to the Chemical & Forest Products segment, and the proportion of assets attributable to the Chemical & Forest Products segment of total group assets.

The pulp & paper adjuster is thus based on the following calculation:

$$=(((978/7117.686)*(16.1/31))/3) = 2.38\%$$

The timber adjuster is thus based on the following calculation:

$$=(((978/7117.686)*(16.1/31))/3) = 2.38\%^{14}$$

4.2.4 Summary

The analysis of the segment reporting four pulp & paper companies has highlighted a number of issues. Foremost among these is that it is very difficult to differentiate up-, mid- and downstream stages in the segment reporting of companies engaged in the pulp & paper supply chain. Companies operating in this segment seem to view the pulp & paper supply chain as a whole, and not in parts as is more common in the palm oil sector

Moreover, it is sometimes even difficult to separate the pulp & paper supply chain from other commodity supply chains in the segment reporting. This may be linked to the size of the companies involved.

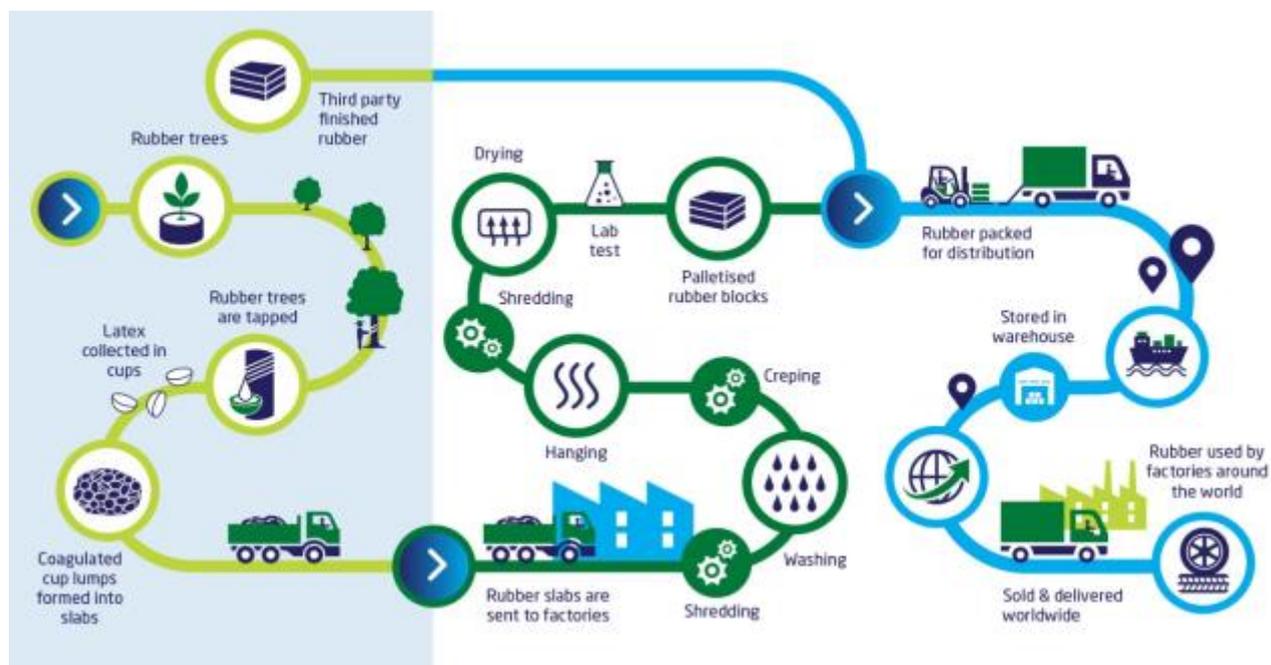
4.3 Natural rubber

This sub-section presents the natural rubber supply chain, the type of companies involved in the natural rubber supply chain, and their segment reporting in company filings. The sub-section is organized as follows: section 4.3.1 will outline the natural rubber supply chain. Section 4.3.2 will describe the kind of companies involved at the various stages of the natural rubber supply chain. Section 4.3.3 will present extracts and analyses of segment information relevant for developing segment adjusters from company filings. Finally, section 4.3.4 will summarize the findings of the analyses.

4.3.1 Supply chain

Natural rubber has many uses, from cement to tires, and from piping to latex gloves. The supply chain starts from the tapping of rubber trees (see Figure 8).

Figure 8 Natural rubber supply chain



Source: Halcyon Agri (n.d.), "Natural rubber supply chain", online: <https://www.halcyonagri.com/wp-content/uploads/2015/04/origination1.jpg>, viewed in February 2017.

Figure 8 primarily shows the upstream and midstream segments. The rubber supply chain can be separated into three segments. These are as follows:

- **Upstream**

This segment includes rubber plantations and rubber smallholders, rubber tapping, collection of cup lumps and the processing of cup lumps into slabs for transportation to factories. These processes take place far away from factories.

- **Midstream**

Rubber slabs are transported to factories for processing into varying types and grades of palletized rubber blocks.

- **Downstream**

Different types and grades of rubber are used by end product and component manufacturers, including tire manufacturers, rubber glove manufacturers and shoe makers.

4.3.2 Natural rubber companies

A variety of companies, of different sizes and business portfolios, operate in the natural rubber supply chain. They can operate at various stages:

- **Upstream**

Similar to the palm oil supply chain, in the upstream segment of the natural rubber supply chain, smallholder operations are also common. Additionally, larger integrated companies operate natural rubber plantations. Some of these companies operate only in the natural rubber sector (e.g. Sri Trang Agro-Industry), while others are active to a greater degree in other sectors, particularly palm oil (e.g. Batu Kawan Group's Kuala Lumpur Kepong and Socfin Group).

- **Midstream**

Midstream operations include integrated plantation companies such as Socfin Group, Southland Rubber and the Vietnam Rubber Group. It also includes downstream companies, such as tire manufacturers, and rubber product manufacturers, with investments further upstream investments, such as Itochu through its subsidiaries including Aneka Bumi Pratama (rubber factories) in Indonesia and Thaitech Rubber Corporation (rubber factories) in Thailand.

- **Downstream**

Downstream companies are primarily end product and component manufacturers as mentioned above.

4.3.3 Segment reporting in company filings

This section will present the segment reporting of two companies engaged at various stages in the natural rubber supply chain. The companies differ in size, and business portfolios, have activities in, among others, Indonesia, Malaysia, Thailand, and Japan. The companies that will be presented are the following:

- Itochu
- Kuala Lumpur Kepong

- **Itochu**

Itochu is a large international conglomerate. It is active in seven operating segments. These are as follows (additional details are only provided for the segment which includes the commodity in question – natural rubber):

- Textile company
Raw materials for clothing / industrial materials; apparel; and brand business.
- Machinery company
Plant project; marine and aerospace; automobile; construction machinery; industrial machinery and healthcare.
- Metals & minerals company
Metals & mineral resources; steel & non-ferrous products; solar and environmental services.
- Energy & chemicals company
Energy and chemicals.
- Food company
Food resources; product processing; midstream distribution, and; retail.
- General products & realty company
Forest products & general merchandise: logs, lumber, wood fibreboard; building materials, wood chips, wood pulp, recycled paper, cotton linter, paper, paperboard, paper products, natural rubber, tires, glass, cement, slag, landscape materials, refractory materials, natural gypsum, biomass fuels (chips, pellets), etc; construction, realty and logistics.
- ICT & financial business company
ICT; financial & insurance business.¹⁵

As the segment definitions above show, the natural rubber segment is included within the General products and realty company, along with other forest products including logs, pulp & paper, and glass, among others. Figure 9 shows Itochu's segment reporting. Although the reported financial indicators are useful to develop sector adjusters for the identified investments and credit, the segment definitions are too broad to single out the natural rubber supply chain.

Figure 9 Itochu segment reporting (2017 Q1)

	For the three-month period ended June 30, 2016 (April 1, 2016 -June 30, 2016)								Millions of U.S. Dollars
	Textile	Machinery	Metals & Minerals	Energy & Chemicals	Food	General Products & Realty	ICT & Financial Business	Others, Adjustments & Eliminations	Consolidated
Revenues:									
Revenues from external customers	\$ 1,164	\$ 886	\$ 361	\$ 3,071	\$ 2,546	\$ 1,299	\$ 1,366	\$ 61	\$ 10,754
Intersegment revenues.....	1	-	-	2	1	31	15	(50)	-
Total revenues.....	1,165	886	361	3,073	2,547	1,330	1,381	11	10,754
Gross trading profit	301	247	108	371	652	361	345	33	2,418
Trading income	43	59	66	44	144	82	39	(6)	471
Net profit attributable to ITOCHU.....	41	160	82	44	124	89	82	88	710
[Equity in earnings (losses) of associates and joint ventures].....	[5]	[53]	[35]	[10]	[30]	[23]	[78]	[126]	[360]
Total assets at June 30, 2016	4,811	8,939	7,758	9,856	16,703	7,599	6,102	12,710	74,478

Source: Itochu (2016, August), *Consolidated Financial Results for the First Quarter of the Fiscal Year 2017 Ending March 31, 2017*, p. 15.

A closer look at the annual report does allow for a differentiation between the Forest products & general merchandise and Construction, realty and logistics segments on the basis of net profit and total assets.¹⁶ However, this differentiation is still not sufficient to adequately develop an accurate sector adjuster.

Adjuster calculation as in Forestsanfinance.org dataset

As mentioned above, Itochu has seven reportable operating segments: Textile; Machinery; Metals & Minerals; Energy & Chemicals; Food; General Products & Realty, and; ICT & Financial Business. The General Products & Realty segment is composed of Forest Products & General Merchandize and Construction, Realty & Logisitics sub-segments. Rubber, pulp & paper, and timber fall within the Forest Products & General Merchandize sub-segment. Within the Forest Products & General Merchandize sub-segment there are roughly four commodity groups: timber, pulp & paper, rubber, and other. The timber, pulp & paper and rubber adjusters therefore each represent a quarter of the total assets attributable to the Forest Products & General Merchandize sub-segment within the General Products & Realty segment. Itochu's palm oil is solely produced by Fuji Oil. Palm oil is included in Itochu's Food segment. Therefore, the palm oil adjuster is Fuji Oil's palm oil proportions, applied to the Fuji Oil's contribution to the revenue of Itochu. Contribution to revenues is the only breakdown at the company level.

The palm oil adjuster was based on the following calculation:

$$=(2.4*((1088*0.75)/(1088+1382+405)))/240.4 = 0.28\%$$

The pulp & paper adjuster based on the following calculation:

$$=((810.8/8036.4)*0.75)/4 = 1.89\%$$

The rubber adjuster based on the following calculation:

$$=((810.8/8036.4)*0.75)/4 = 1.89\%$$

The timber adjuster based on the following calculation:

$$=((810.8/8036.4)*0.75)/4 = 1.89\%^{17}$$

- **Kuala Lumpur Kepong**

Kuala Lumpur Kepong (PO) operates in five segments. These are:

- Plantation
Cultivation and processing of palm and rubber products, refining of palm products, kernel crushing and trading of palm products.
- Manufacturing
Manufacturing of oleochemicals, non-ionic surfactants and esters, rubber gloves, parquet flooring products, pharmaceutical products and storing and distribution of bulk liquid
- Property development
Development of residential and commercial properties
- Investment holding

Placement of deposits with licensed banks, investment in fixed income trust funds and investment in quoted and unquoted corporations

- Others

Farming, management services and money lending¹⁸

From the above segment definitions it appears that KLK is active throughout the natural rubber supply chain, from upstream to downstream. However, its segmentation includes another supply chain, i.e. palm oil.

Figure 10 Kuala Lumpur Kepong segment reporting (2016)

	Plantation RM'000	Manufacturing RM'000	Property Development RM'000	Investment Holding RM'000	Others RM'000	Elimination RM'000	Consolidated RM'000
2016							
Revenue							
Sale to external customers	8,455,070	7,738,841	110,693	122,542	78,664	-	16,505,810
Inter-segment sales	951,341	-	-	37,423	1,212	(989,976)	-
Total revenue	9,406,411	7,738,841	110,693	159,965	79,876	(989,976)	16,505,810
Results							
Operating results	827,277	370,610	25,219	60,006	450	-	1,283,562
Interest income	723	5,653	6	86,748	742	(37,423)	56,449
Finance costs	(11,041)	(53,157)	-	(119,607)	(11,394)	37,423	(157,776)
Share of profits/(loss) of equity accounted associates, net of tax	4,985	116	3,407	-	(7,643)	-	865
Share of profits/(loss) of equity accounted joint ventures, net of tax	4,425	-	-	-	(288)	-	4,137
Segment results	826,369	323,222	28,632	27,147	(18,133)	-	1,187,237
Corporate income							525,047
Profit before taxation							1,712,284
Tax expense							(29,144)
Profit for the year							1,683,140
Assets							
Operating assets	6,171,205	6,506,518	1,321,245	3,009,481	503,720	-	17,512,169
Associates	62,602	5,749	70,452	-	-	-	138,803
Joint ventures	163,472	-	-	-	9,912	-	173,384
Segment assets	6,397,279	6,512,267	1,391,697	3,009,481	513,632	-	17,824,356
Unallocated assets							512,217
Total assets							18,336,573
Liabilities							
Segment liabilities	1,306,873	2,462,692	43,487	2,900,020	8,805	-	6,721,877
Unallocated liabilities							326,670
Total liabilities							7,048,547
Other information							
Depreciation of property, plant and equipment	147,937	216,360	949	-	11,336	-	376,582
Amortisation of leasehold land	2,801	260	-	31	-	-	3,092
Amortisation of prepaid lease payments	5,908	1,066	-	-	-	-	6,974
Amortisation of biological assets	57,556	-	-	-	-	-	57,556
Non-cash expenses							
Property, plant and equipment written off	1,977	3,369	-	-	-	-	5,346
Retirement benefits provision	18,583	20,355	-	-	-	-	38,938
Amortisation of intangible assets	-	4,650	-	-	-	-	4,650
Impairment of leasehold land (included under corporate income)	-	-	-	-	-	-	8,096
Impairment of goodwill (included under corporate income)	-	-	-	-	-	-	952

Source: Kuala Lumpur Kepong (2016, December), *Annual Report 2016*, p. 145.

Figure 10 and Figure 11 show segmentation on a number of financial indicators, including capital expenditures. These indicators are useful for developing sector adjusters for identified investments and credit. However, it is important to further separate the palm oil and natural rubber supply chains.

Figure 11 Kuala Lumpur Kepong capital expenditure segment reporting (2016)

	Plantation RM'000	Manufacturing RM'000	Property Development RM'000	Investment Holding RM'000	Others RM'000	Total RM'000
2016						
Capital expenditure	364,498	477,552	870	-	70,995	913,915
Land held for property development	-	-	903,959	-	-	903,959
Intangible assets	-	5,333	-	-	-	5,333
	364,498	482,885	904,829	-	70,995	1,823,207
2015						
Capital expenditure	444,425	462,424	2,174	213	54,593	963,829
Land held for property development	-	-	8,975	-	-	8,975
Intangible assets	-	871	-	-	-	871
	444,425	463,295	11,149	213	54,593	973,675

Source: Kuala Lumpur Kepong (2016, December), *Annual Report 2016*, p. 145.

Figure 12 allows for a differentiation of rubber and palm oil on the basis of revenue and profit at the plantation and primary processing (upstream) stage. However, it is not possible to differentiate at the midstream segment.

Figure 12 Kuala Lumpur Kepong additional segment reporting (2016)

	2016 RM'000	2015 RM'000	2014 RM'000	2013 RM'000	2012 RM'000
REVENUE					
Palm products	8,345,079	6,976,697	5,089,772	3,952,232	4,487,975
Rubber	109,991	109,550	145,158	178,542	258,484
Manufacturing	7,738,841	6,241,324	5,634,338	4,696,734	5,057,812
Retailing	-	-	-	-	502,777
Property development	110,693	123,275	117,063	208,589	172,516
Investment income	122,542	125,846	78,799	79,750	62,922
Others	78,664	73,299	64,843	31,478	27,702
	16,505,810	13,849,991	11,129,973	9,147,325	10,570,188
GROUP PROFIT					
Palm products	817,160	775,606	985,875	734,689	1,069,504
Rubber	10,117	4,721	20,589	45,804	109,340
Manufacturing	370,610	218,912	288,077	329,275	187,736
Retailing	-	-	-	-	27,744
Property development	25,210	49,448	45,672	80,807	36,879
Investment holding	60,006	70,714	33,662	59,117	35,127
Interest income	56,449	43,302	36,109	29,363	27,442
Finance costs	(157,776)	(104,507)	(87,375)	(80,902)	(66,225)
Others	450	14,987	21,279	(9,085)	4,404
Share of profits of equity accounted associates, net of tax	865	11,882	5,878	13,432	10,567
Share of profits/(loss) of equity accounted joint ventures, net of tax	4,137	(14,250)	-	-	-
Corporate	525,047	63,783	(32,069)	(2,753)	117,918
Profit before taxation	1,712,284	1,134,598	1,317,697	1,199,767	1,560,436
Tax expense	(29,144)	(250,580)	(285,003)	(232,797)	(300,347)
Profit for the year	1,683,140	884,038	1,032,694	966,970	1,260,089

Source: Kuala Lumpur Kepong (2016, December), *Annual Report 2016*, p. 18.

Adjuster calculation as in Forestsanfinance.org dataset

As mentioned above, KLK has five reportable operating segments: Plantation; Manufacturing; Property Development; Investment Holding, and Others. Adjusters for palm oil and rubber are based on planted area proportions applied to Plantation; Manufacturing segment data. Segment capital expenditures was used.

The 2016 palm oil adjuster is based on the following calculation:

$$=((364498+477552)/913915)*((176391+35183)/(176391+35183+10305+3364)) = 86.55\%$$

Where 176,391 and 35,183 are palm oil planted areas.

The 2016 rubber adjuster is based on the following calculation:

$$=((364498+477552)/913915)*((10305+3364)/(176391+35183+10305+3364)) = 5.59\%$$

Where 10,305 and 3,364 are rubber planted areas.¹⁹

4.3.4 Summary

The analysis of the segment reporting three companies engaged in the natural rubber supply chain has highlighted a number of issues. Foremost among these is that it is very difficult to differentiate up-, mid- and downstream stages in the segment reporting of companies. Moreover, it is even sometimes difficult to separate the natural rubber supply chain from other commodity supply chains in the segment reporting. This may be linked to the size of the companies involved, and also the characteristic of the commodity also being a plantation product often planted on the same estates as palm oil by plantation companies.

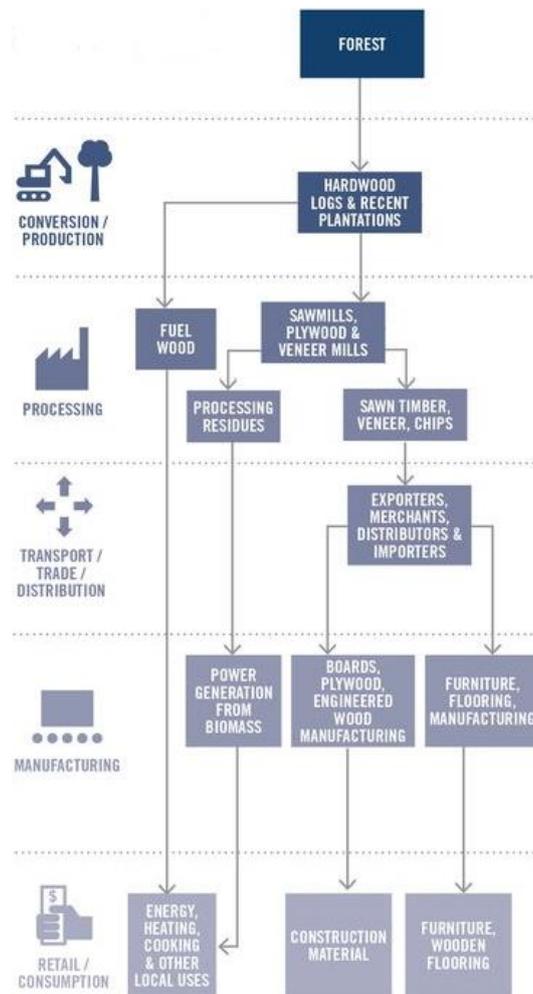
4.4 Timber

This sub-section presents the timber supply chain, the type of companies involved in the timber supply chain, and their segment reporting in company filings. The sub-section is organized as follows: section 4.4.1 will outline the timber supply chain. Section 4.4.2 will describe the kind of companies involved at the various stages of the timber supply chain. Section 4.4.3 will present extracts and analyses of segment information relevant for developing segment adjusters from company filings. Finally, section 4.4.4 will summarize the findings of the analyses.

4.4.1 Supply chain

The timber supply chain has many functions, including its use as raw material for furniture and as building materials. Figure 13 presents the timber supply chain.

Figure 13 Timber supply chain



Source: Global Canopy Programme (n.d.), "Timber, pulp and paper supply chain), online: <https://s-media-cache-ak0.pinimg.com/564x/5f/50/d9/5f50d92c6ed715b88ad2a7a8195c3dc6.jpg>, viewed in February 2017.

The timber supply chain can be separated into three segments. These are:

- **Upstream**

This stage is the forest concession and includes harvesting.

- **Midstream**

This stage refers to sawmills, plywood mills, and veneer mills.

- **Downstream**

The downstream segment includes the manufacturing of the sawn timber, plywood, and veneer into boards, furniture, flooring and other wood products.

4.4.2 Timber companies

A variety of companies operate in the timber supply chain. These range from fully vertically integrated companies operating forest concessions and manufacturing a variety of wood products; to companies operating solely at the upstream forest concession, midstream mills, or downstream manufacturing plants. However, it should be noted that the sector is comparatively capital intensive as upstream companies have to own large tracts of land.

- **Upstream**

Companies operating at this stage are concession owners and forest management companies. Often these companies also include a degree of integration into the midstream segment. Examples include Sumatera Timber Utama Damai (PT STUD), Alas Kasuma and Intracawood. All three are concession owners that also operate mills.

- **Midstream**

Midstream companies operate mills. They can be supplied by their own forest concessions or by third parties, and thus can be integrated also into the upstream segment. Midstream companies can also be integrated in the downstream segment.

- **Downstream**

Companies operating at this stage manufacturer end products including flooring, furniture, construction materials, and other wood-based end products. These companies can be integrated into the midstream segment, or can be fully integrated companies which operate forest concessions, mills, and manufacturing plants. Examples of these fully integrated companies include Sumitomo Forestry and Samko Timber.

4.4.3 Segment reporting in company filings

This section will present the segment reporting of two companies engaged in the timber supply chain. The companies differ in size, and business portfolios, and both have activities primarily in Indonesia. The companies that will be presented are the following:

- Barito Pacific
- Samko Timber

- **Barito Pacific**

Barito Pacific's reportable segments are based on the following operating divisions:

- Petrochemical
- Wood manufacturing
- Property
- Plantations²⁰

The company does not provide further definitions of these segments in the relevant sections of the annual report. Seeking further information from the website shows that the plantation segment is composed of upstream palm oil operations (plantations and mills),²¹ and the wood manufacturing segment is composed of upstream (forest concessions) and midstream (mills) timber supply chain activities.²²

As such, the financial indicators which Barito Pacific includes in its segment reporting shows in Figure 14 can be used to develop sector adjusters for identified investments and credit. However, downstream and midstream segments in the timber supply chain cannot be adequately separated.

The figure shows that 0.02% of Barito Pacific's capital expenditures were in the timber supply chain, 3.4% of its total assets, generating less than 1% of its total revenues, as the company's main source of revenue is its petrochemical business.

Figure 14 Barito Pacific segment reporting (2015)

31 Desember/December 31, 2015							
	Petrokimia/ Petrochemical US\$ '000	Industri Pengolahan Kayu/ Wood Manufacturing US\$ '000	Properti/ Property US\$ '000	Perkebunan/ Plantations US\$ '000	Eliminasi/ Elimination US\$ '000	Konsolidasi/ Consolidated US\$ '000	
PENDAPATAN DAN HASIL SEGMENT							SEGMENT REVENUES AND RESULTS
Pendapatan eksternal	1.377.573	6.551	3.247	18.768	-	1.406.139	External revenues
Pendapatan antar segment	-	1.987	1.227	-	(3.214)	-	Inter-segment sales
Jumlah pendapatan	1.377.573	8.538	4.474	18.768	(3.214)	1.406.139	Total revenues
HASIL							RESULT
Hasil segment	59.620	(5.920)	1.380	(6.474)	(9.387)	39.219	Segment result
Bagian rugi bersih entitas asosiasi	(3.720)	(689)	(73)	-	-	(4.482)	Share in net loss of an associates
Laba sebelum pajak						34.737	Profit before tax
SEGMENT ASET DAN LIABILITAS							SEGMENT ASSETS AND LIABILITIES
Aset segment	2.053.952	77.218	44.279	85.733	(68.472)	2.193.710	Segment assets
Investasi pada entitas asosiasi dan ventura bersama	38.017	10.163	5.599	-	-	53.779	Investment in associates and joint venture
Aset yang tidak dapat dialokasikan						5.595	Unallocated assets
Jumlah Aset						2.253.084	Total Assets
Liabilitas segment	991.499	30.328	9.417	68.439	(68.467)	1.031.216	Segment liabilities
Liabilitas yang tidak dapat dialokasikan						25.959	Unallocated liabilities
Jumlah liabilitas						1.057.175	Total liabilities
INFORMASI LAINNYA							OTHER INFORMATION
Pengeluaran modal	228.603	44	1.116	1.716	-	231.479	Capital expenditures
Beban penyusutan	72.092	1.546	1.172	2.530	-	77.340	Depreciation expense

Source: Barito Pacific (2016, April), *2015 Annual Report: A Sustained Focus on Our Strategic Growth*, p. FS-90.

Adjuster calculation as in Forestsanfinance.org dataset

As mentioned, Barito Pacific has four reportable operating segments: Petrochemical; Wood manufacturing; Property, and; Plantations. Palm oil adjuster is based on Plantations segment, timber adjusters is based on Wood manufacturing segment. Segment capital expenditures were used.

The 2015 palm oil adjuster is based on the following calculation:

$$=1716/231479 = 0.74\%$$

The 2015 timber adjuster is based on the following calculation:

$$=44/231479 = 0.02\%^{23}$$

- **Samko Timber**

Samko Timber has defined two segments based on its products and services. These are:

- SGS division

These are the operations of PT Sumber Graha Sejahtera group of entities. This division principally in the business of manufacturing and sales of 1) primary processed timber products (main) such as general plywood and laminated veneer lumber and 2) secondary processed timber products such as truck, piano body parts and decking.

- ST division

These are the operations of Samko Timber Limited and Samko Trading Pte Ltd group of entities. This division principally trade in all types of timber products manufactured by the division, SGS division and third parties. This division also produces mainly secondary timber products such as doors and windows.²⁴

Missing from these definitions, but apparent from the website, is that Samko Timber also operates an industrial timber plantation, and has investments (though diluted from 51.62% to 31%) in Sumalindo Lestari Jaya which has both timber concessions and industrial timber plantations.²⁵ On the basis of the above definitions and the information gathered from the company website, it is clear that Samko Timber is a fully vertically integrated timber company, with forest management companies, mills, and manufactured timber products. The manufactured timber products (downstream operations) are included in both their SGS division and their ST division. The ST division is also active in trading of all types of timber products.

Figure 15 presents Samko Timber's segment reporting on a number of financial indicators, including assets and revenues – useful for developing sector adjusters. Moreover, the segment reporting also includes loans and borrowings per segment. However, there are no further indicators that would facilitate breaking down Samko Timber's segment reporting into the three segments of the timber supply chain.

Figure 15 Samko Timber segment reporting (2015)

	SGS division		ST division		Adjustments and eliminations		Notes	Per consolidated financial statements	
	2015	2014	2015	2014	2015	2014		2015	2014
	Rp'million	Rp'million	Rp'million	Rp'million	Rp'million	Rp'million		Rp'million	Rp'million
Revenue:									
External customers	1,981,991	1,913,341	1,481,017	1,368,451	–	–		3,463,008	3,281,792
Inter-segment	1,376,513	1,252,756	–	–	(1,376,513)	(1,252,756)		–	–
Total revenue	3,358,504	3,166,097	1,481,017	1,368,451	(1,376,513)	(1,252,756)		3,463,008	3,281,792
Results:									
Finance income	494	589	50	62	–	–		544	651
Finance expenses	(75,211)	(50,492)	(16,231)	(15,844)	–	–		(91,442)	(66,336)
Depreciation of property, plant and equipment	(129,186)	(111,295)	(2,800)	(3,092)	–	–		(131,986)	(114,387)
Amortisation of land use rights	(3,905)	(4,252)	–	–	–	–		(3,905)	(4,252)
Post-employment benefits expense	(47,135)	(34,433)	(942)	(1,583)	–	–		(48,077)	(36,016)
(Loss)/gain on change in fair value of biological assets	(2,589)	5,530	–	–	–	–		(2,589)	5,530
Assets:									
Inventories written-down	(54,609)	(1,165)	–	–	–	–		(54,609)	(1,165)
Impairment of intangible assets	(3,723)	–	(31,192)	–	–	–		(34,915)	–
Amortisation of intangible assets	(263)	(1,309)	(729)	–	–	–		(992)	(1,309)
Tax (expense)/benefit	(29,056)	(9,080)	1,420	(4,818)	–	–		(27,636)	(13,898)
Segment (loss)/profit	(435,575)	3,721	(42,835)	(1,046)	–	–		(478,410)	2,675
Liabilities:									
Deferred tax assets	60,436	89,329	4,880	3,912	–	–		65,316	93,241
Segment assets	1,757,914	1,666,583	523,380	962,325	(387,960)	(587,319)	A	1,893,334	2,041,589
Liabilities:									
Loans and borrowings	742,265	533,486	250,618	243,925	–	–		992,883	777,411
Income tax payable	10,261	18,326	1,140	2,991	–	–		11,401	21,317
Deferred tax liabilities	486	2,266	83	126	–	–		569	2,392
Segment liabilities	1,732,034	1,414,400	392,722	361,944	(386,998)	(348,256)	B	1,737,758	1,428,088

Source: Samko Timber (2016, April), *Our Commitment to Moving Forward: Annual Report 2015*, p. 122-3.

Adjuster calculation as in Forestsanfinance.org dataset

As mentioned above, Samko Timber has two reportable operating segments: Sumber Graha Sejahtera, and; Samko Timber Limited & Samko Trading. Both segments are up- and mid-stream segments for the timber supply chain. Therefore, the timber adjuster is set at 100%.²⁶

4.4.4 Summary

From the above analysis of the segment reporting of three companies engaged in the timber supply chain a number of things become clear. Firstly, reporting and definitions of segments are inconsistent. Each company is free to define its own reporting segments in accordance with accounting practices and business strategies. Secondly, partly as a result, it is not possible to separate out the three stage of the timber supply chain. This is also largely due to the fact that integrated companies report on product lines rather than supply chain segments.

For none of the analysed companies active in the timber supply chain was it possible to separate any of the three stages of the supply chain.

4.5 Summary and methodological implications

The above analyses have found a number of trends. Large conglomerates report segments along product lines not supply chain stages. For very large conglomerates it is often not even possible to separate out a relevant sub-product line (e.g. the pulp & paper product line within Housing and retail goods). In the palm oil and rubber supply chains, integrated companies occasionally report in supply chain stages. The vast majority of integrated companies do not report in supply chain stages.

As it is not possible to consistently breakdown the supply chains of the analysed companies into up-, mid- and downstream segments, this research developed sector adjusters for whole supply chains. This with the understanding that the impact of upstream operations (potential deforestation and human rights issues) is driven by the demand from the mid- and downstream segments.

Segment adjusters were developed using the segment reporting in annual reports to the fullest extent possible, complemented by further information from company publications and websites where necessary. The following financial indicators were used in order of preference: *segment capital expenditures / additions to non-current assets, segment liabilities, segment assets, segment revenues, and segment profit/loss.*

Where financing was identified at the subsidiary level, this research identified the segment activities using company publications. Where financing was identified for a financing vehicle, the group level adjuster was applied.

Segment adjusters were developed for all companies and every year for which financing was identified.

The segment adjusters, including source, details of the methodology and indicators used, and segment definitions of the companies in question, are available on the Forests & Finance website.

4.6 Example

This sub-section illustrates how a segment adjuster is developed for a company and applied to identified financing.

In July 2012, Rimbunan Hijau Group subsidiary Jaya Tiasa Holdings issued shares worth US\$104 million which were underwritten by CIMB Group and RHB Banking. CIMB underwrote US\$78 million, while RHB Banking underwrote US\$26 million.

Jaya Tiasa has four reportable operating segments: Logs Trading; Manufacturing; Oil Palm, and; Others. The timber adjuster is based on Logs Trading and Manufacturing segments, as the latter is purely focused on wood products. The palm oil adjuster is based on the Oil Palm segment. Details for the segment additions to non-current assets / capital expenditures were available and thus used. Using these segment definitions and figures, 77% of Jaya Tiasa's capital expenditures were in palm oil in 2012, while 23% were in timber.

Therefore, US\$80 million of the US\$104 share issuance was attributed to palm oil, with the remaining US\$24 million attributed to timber. At the individual financial institution level, US\$60 million of CIMB's US\$78 million contribution was attributed to palm oil, while US\$18 million was attributed to timber. For RHB Banking US\$20 million was attributed to palm oil, while US\$6 million was attributed to timber.

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