# Condom supply to global fund: An analysis of participation by Malaysian companies

## Lee Siu Ming[*]

**Economics Unit, School of Distance Education, Universiti Sains Malaysia, Penang 11700, Malaysia.**

## Abstract

Malaysia, the world's largest single exporter of condoms, supplies of condoms to Global Fund to Fight AIDS, Tuberculosis and Malaria (GFATM) recipients is valued at about USD37 billion which is about 41% of the total USD91 million condoms procured for the period of 2008–2013. This is despite the backdrop of encouraging local production of health commodities in Africa and participation of local African manufacturers to be qualified suppliers. There has also been reported instances of poor quality products supplied, breach in procurement procedures, and high unit costs of condoms. This study identified the country characteristics and product characteristics of Malaysia's firms supply of condoms to the Global Fund programme. The study also contributes in providing decision-makers and suppliers (not only limited to Malaysian suppliers) on the important country and product characteristics in the supply of contraceptives besides increasing information to potential applicants for tender called by GFATM. Random effect estimation was conducted on unbalanced panel data of Malaysia's supply of condoms to Global Fund recipients in 44 countries for the period of 2008–2013. In terms of country characteristics, HIV prevalence and African countries were significantly positive, while being a fragile state (World Bank classification), health expenditure per capita and number of physician per 1,000 people were insignificant. For product characteristics, average quantity divided by distance between Malaysia and recipient country, and average unit price of below USD0.07 were significant but average unit price of below USD0.02 were insignificant (average price based on past literature of procurement for Global Fund). The increased analysis and discussion of these country and product characteristics based on data on public domain (for increased transparency) has noticeable effect towards more efficient supply process. Suppliers or aspiring suppliers may supply condoms for social cause to the recipients in countries that need them at product characteristics most required, thus also contributing to more efficient tender and supply process.

**Keywords:** Global Fund, condom, country characteristics, product characteristics

**Article history:** Received 19 February 2019, Accepted 21 February 2020

## 1. Introduction

The Global Fund to Fight AIDS, Tuberculosis and Malaria (GFATM) is a partnership launched in 2002 to support programs and communities most in need. Over USD10 billion has been invested between 2014 and 2016 for the procurement and management of health products to support countries fighting AIDS, TB and malaria and improving health systems, and about half of the amount is in the procurement and management of health products [1]. One of the products required under the program is sheath contraceptives. Contraceptives are a critical component in a holistic and sustainable approach to the HIV prevention [2]. Malaysia is the world's largest exporter of sheath contraceptives [3]. Malaysia's export of contraceptives (HS401410) was value at USD 93.6 million in

2016 based on data from the United Nations International Trade Statistics Database (UN Comtrade).

GFATM secretariat will propose a grant agreement with a principal recipient after a proposal is approved [4]. A principal recipient is an organisation nominated by the Country Coordinating Mechanisms to receive funds, implement programs and disburse funds to sub-recipients. The approval is far from automatic, where grants are given based on merit of proposals [5], and approval is not more than half of the proposals submitted [4]. GFATM remains an important source of funding as HIV/AIDS programs in many high-prevalence, low-income countries rely heavily on external funding [6]. The price and quality reporting (PQR) was introduced by GFATM in 20057 which collects the procurement transactions data made by Global Fund-supported programs. Wafula [8] argued that PQR collects a substantial amount of data but there is no or

[*]Corresponding author; email:leesiuming123@gmail.com

limited published analysis on regional and temporal variations.

In the process of supply of condoms to recipients of the GFATM, there are also several instances of poor quality products supplied, breach in procurement procedures, and high unit costs of condoms supplied. In 2016, it was reported that Ethiopia needed to dispose USD 2 million worth of contraceptives purchased from an unnamed Indian company as they were defective and of poor quality [9]. Meanwhile, procurement procedures were breached in Ghana in 2013, where only about 1% of the total quantity required is supplied and the size were smaller than required [10]. Besides that, the Namibian government, under the pressure from Global Fund, terminated supply arrangement with Comex in 2010 due to the high unit costs of condoms supplied by Comex [11].

As the leading global exporter of sheath contraceptives, Malaysian exporters' participation in the supply to Global Fund programs is important as it enables these companies to produce their products at an internationally-benchmarked reasonable pricing without compromising the quality for a social cause at the same time. Humanitarian aid is also an important business component for contraceptives corporations. Karex [12], the largest condom manufacturer globally highlighted that its sales in 2016/2017 financial year were affected by non-governmental organisations' uncertainty to secure humanitarian aid. The acceptance of decision-makers to select Malaysian firms also shows that Malaysian firms understand the need of the recipients in the target countries.

Based on an analysis [13] to make the case for investment in condom for 81 countries in 2015, the number of condom required for HIV and sexually transmitted infections prevention is estimated to be at 26.7 billion pieces but only 15.8 billion were used in the sample of 81 countries. The condom gap is estimated to be concentrated in Southern Asia, and Middle and Western Africa. Meanwhile, in the analysis of procurement cost trends for the Global Fund [8], it was reported that the procurement costs of condoms have remained constant and relatively stable between 2005 and 2012. Male condoms are the most procured type of condom. The Eastern Europe and Central Asia (EECA) regions had the highest median cost, at USD0.07 while the lowest median cost of condoms is in the Sub-Saharan Africa West and Central Africa (SSA-WCA), South Asia and Middle East and North Africa (MENA) regions, at USD0.02. This reported cost is within the range reported by Karex. Karex highlighted that the company, as an original equipment manufacturer (OEM), sells a piece of condom at an average price of USD0.03. Meanwhile, the data from UN Comtrade shows that, the average price for sheath contraceptives for the period of 1989–1996 and 1999 is around USD0.02–0.20. Studies also [8, 14] further suggested that future analyses to describe variation in unit costs of Global Fund commodities in greater depth.

Karex [12] as the only public listed contraceptives company in Malaysia maintains that tender market is still relatively important for manufacturers. The tender market contributes around 50%–54% of Karex's revenue between 2015 and 2017. Karex participates in tenders called by institutions such as United Nations Population Fund (UNFPA), United States Agency for International Development (USAID), Population Service International (PSI), Marie Stopes International (MSI), John Snow Inc (JSI) and Crown Agents International Limited. Another listed condom company in Thailand [16] also reported that the average contribution of tender business to the total revenue is between 25%–37% in the period of 2013–2015.

Although the Global Fund has stated that local production of health commodities in Africa and participation of local African manufacturers to be qualified suppliers is encouraged, the involvement of Malaysia's sheath contraceptives companies in the supply is still noticeable. The supply of male condoms by Malaysia, as a single country, to GFATM recipients is valued at about USD37 billion which is about 41% of the total USD91 million for the period of 2008-2013. Condoms procured under the Global Fund needs to fulfil the World Health Organisation (WHO) Procurement Guidelines [17]. The contraceptives by Malaysia to GFATM recipients were supplied to 44 countries which consists of 11 countries classified as low-income, 19 lower middle-income countries while the remaining 14 are high middle-income countries based on World Bank [18] classification (full list of recipient countries are listed in Table 6 in Appendix).

The objectives of this study were to identify the country characteristics and product characteristics in Malaysian companies supply of contraceptives to the GFATM programme. The study also contributes in providing decision-makers and suppliers (not only limited to Malaysian suppliers) on the important country and product characteristics in the supply of contraceptives besides increasing information to increase potential applicants' success of tender by the Global Fund. This information is significant to contraceptive companies as the tender segment still remains significant to many of these companies. This study also provides information to stakeholders for benchmarking on the product characteristics to make more well-informed decision during procurement process. A distinction of this study is the identification of suppliers from a specific country (Malaysia in this case) which was not available in past studies analysing procurement and supply to Global Fund recipients, at least by studies using publicly available data. A solid evidence based on pricing could empower the developing countries to make cost-effective procurement choices [14], which is a critical factor in the long-term sustainability of treatment for HIV/AIDS.

**Table 1.** Malaysia's exporters in sheath contraceptives supply to global fund.

| | |
|---|---|
| Dongkuk Techno Rubber Ind | Nulatex Sdn. Bhd. |
| Innolatex Sdn Bhd | Pleasure Latex Products |
| Karex Industries Sdn Bhd | SSN Medical Products Sdn Bhd |
| Medical Latex (DUA) Sdn. Bhd. | |

**Table 2.** Correlation matrix for study variables.

| | $\ln(HEALTH)$ | $\ln(HIV)$ | $AFRICA$ | $\ln(FS)$ | $\ln(\frac{P}{1000})$ |
|---|---|---|---|---|---|
| $\ln(HEALTH)$ | 1.000000 | -0.207955 | -0.016824 | 0.258836 | 0.182955 |
| $\ln(HIV)$ | -0.207955 | 1.000000 | 0.648100 | -0.052001 | -0.578005 |
| $AFRICA$ | -0.016824 | 0.648100 | 1.000000 | 0.300681 | -0.466344 |
| $\ln(FS)$ | 0.258836 | -0.052001 | 0.300681 | 1.000000 | -0.021695 |
| $\ln(\frac{P}{1000})$ | 0.182955 | -0.578005 | -0.466344 | -0.021695 | 1.000000 |

## 2. Methods

Recipients in 44 countries reported the purchase of contraceptives from Malaysia between 2008 and 2013. The first part of this study looked into the country characteristics to assess the extent to which physicians per 1,000 people, the prevalence of HIV, whether as a fragile state, and whether being an African state are significant determinants to Malaysian companies' involvement in supplying condoms to GFATM recipients. This study adapted and modified the model in past study [5], which employed random model estimations to examine the major determinants of Global Fund grant implementation in developing countries.

The following empirical model to examine the relationship of country characteristics with Malaysia's supply of contraceptives to Global Fund was employed using random-effect panel estimation:

$$\ln\left(C_{ij}\right) = \ln\left(\frac{P}{1000_j}\right) + \ln\left(HIV_j\right) + \ln\left(FS_j\right) + AFR_j \tag{1}$$

where $C$ is the value of contraceptives supplied by Malaysian companies to Global Fund programme, $\frac{P}{1000}$ is the number of physicians for every 1,000 people, $HIV$ is the prevalence of HIV, $FS$ is whether a country is a fragile state (dummy of 1 for yes; 0 for no), $AFR$ is whether a recipient country is an African country (dummy of 1 for yes; 0 for no), ln is the natural logarithm, $i$ refers to the exporting country, $j$ refers to the importing country.

The second part of this study analyses the product characteristics of condoms supplied to Global Fund recipients:

$$\ln\left(C_{ij}\right) = \ln\left(\frac{Q}{D}\right) + \frac{C}{Q}0.07 + \frac{C}{Q}0.02 \tag{2}$$

where $\frac{Q}{D}$ is the average distance of recipient country from Malaysia, $\frac{C}{Q}0.07$ is the whether the average price of the supply is below USD0.07 per unit (1 for yes; 0 for no). $\frac{C}{Q}0.02$ is the whether the average price of the supply is below USD0.02 per unit (1 for yes; 0 for no).

The average price of USD0.07 and 0.02 is based on past literature of procurement for Global Fund [8].

Random effect (RE) is because of greater flexibility and generalizability. RE is also able to model context, including variables that are only measured at the higher level [19]. Unlike fixed effects estimator, RE estimator does not automatically drop the time invariant regressors [20].

### 2.1. Sources of data

Data on Malaysia's companies supply to Global Fund is obtained from the GFATM Price and Quality Reporting, with the earliest data on Malaysia's supply in 2008. Data on female condoms were not included as the data were very scarce. The individual companies were named in the report, and the author compared the list of sheath contraceptives listed by MREPC to filter out non-Malaysian companies (refer Table 1). The data on fragile states, HIV prevalence, and distance between Malaysia and recipient countries are from World Bank [18] and Centre d'Études Prospectives et d'Informations Internationales (CEPII) [21].

One main weakness of Global Fund data is that the report is based on submission of data by principal recipients that have chosen to report via the Price and Quality Reporting and it is not independently verified [8]. For example, in the dataset for this study, one of the reports shows that the country is reported as Zanzibar, which is a semi-autonomous region of the country of Tanzania. As no other details (for example, information on price and quantity) are potentially to have error, the observation is maintained and grouped under Tanzania.

## 3. Results and Discussion

Table 2 shows the correlation matrix table. Given the high correlation between $\ln(HIV)$ and $AFRICA$ at 0.648, these two independent variables were estimated separately. Other variables did not show potential of

**Table 3.** Descriptive statistics of the annual average price and quantity reported.

| | Average Price (USD) | | | Quantity Reported (Pack) | | |
|---|---|---|---|---|---|---|
| | Minimum | Maximum | Mean | Minimum | Maximum | Mean |
| 2008 | 0.02 | 0.05 | 0.02 | 10,800 | 13,536,000 | 1,576,026 |
| 2009 | 0.02 | 0.16 | 0.03 | 2,970 | 14,400,000 | 1,362,202 |
| 2010 | 0.02 | 0.07 | 0.03 | 79,200 | 41,760,000 | 5,977,690 |
| 2011 | 0.02 | 0.60 | 0.06 | 35,000 | 28,000,000 | 4,670,424 |
| 2012 | 0.03 | 0.74 | 0.07 | 936 | 16,092,000 | 2,447,839 |
| 2013 | 0.02 | 0.13 | 0.04 | 1,000 | 43,200,000 | 2,896,217 |

Source: Author's calculation based on data from Global Fund Price and Quality Reporting

**Table 4.** Results of country characteristics.

| Explanatory variable: $\ln(C_{ij})$ | | |
|---|---|---|
| **Variable** | | |
| $\ln(\frac{P}{1000})$ | -0.081790 (0.1873) | -0.031297 (0.6220) |
| $\ln(\frac{HEALTH}{n})$ | -0.082166 (0.8796) | 0.132450 (0.8015) |
| $FS$ | -0.276262 (0.5761) | 0.302790 (0.5035) |
| $AFRICA$ | 1.441332*** (0.0024) | |
| $\ln(HIV)$ | | 0.471351*** (0.0002) |
| $C$ | 11.41473 | 11.41614 |
| $R^2$ | 0.223715 | 0.307608 |

**Note**: The values in the parentheses are the probabilities of rejecting the null hypothesis of significance. The symbols of ***, ** and * indicates the rejection of null hypothesis at 1%, 5% and 10% significance level respectively.

multicollinearity problem. Table 3 shows the descriptive statistics of the annual average price and quantity reported.

The mean average unit price of condoms supplied by Malaysian companies to Global Fund has not varied much between 2008–2013. The average cost was the lowest at USD0.02 in 2008, and progressively rose, and was at the highest at USD0.07 in 2012. However, the mean unit cost dropped to USD0.04 in 2013. The average unit cost drop was also observed in past literature [8]. There is also little trend in terms of mean quantity of condoms (pack) reported. The lowest mean quantity was in 2009 at 1.4 million packs while the highest quantity (pack) reported was 6.0 million in 2010.

In terms of country characteristics, HIV prevalence and African countries were significantly positive. The relationship between higher demand of condom with HIV prevalence is clear as condom is a device for prevention and infection control. Higher awareness also stems from the higher awareness to do HIV testing. Being an African country is significant positive also shows Malaysian companies condom supply is significant in areas where condom gap is significant as previously highlighted [13] (Southern Asia, and Middle and Western Africa).

On the other hand, being a fragile state (World Bank classification), health expenditure per capita and number of physician per 1,000 people were insignificant. On health expenditure per capita and number of physicians per 1,000 people (also a variable in past studies [4]), they were not significant possibly due to the use of sheath contraceptives for prevention control but used directly for medical treatment purpose.

For product characteristics, average quantity divided by distance between Malaysia and recipient country and average unit price of below USD0.07 were significantly positive. The higher quantity for further distance of the supplies may indicate suppliers' readiness to only tender for higher quantity required due to higher transportation cost. Average unit price of below USD0.07 were significant but average unit price of below USD0.02 were insignificant. These average price selection (USD0.07 and USD0.02) were based on past literature of procurement for Global Fund [8]. The insignificant result of below USD0.02 was initially expected as it was below the average price of Malaysia's export of sheath contraceptives of USD0.02–0.20 between the years 1989-1996 and 1999. Besides that, it was also below the average price

**Table 5.** Results of product characteristics.

| Explanatory variable: $\ln(C_{ij})$ | | |
|---|---|---|
| **Variable** | | |
| $\ln(\frac{Q}{D})$ | 0.754127*** (0.0000) | 0.732425*** (0.0000) |
| $\frac{C}{Q}$ 0.07 | -1.755045*** (0.0020) | |
| $\frac{C}{Q}$ 0.02 | | -0.198077 (0.6099) |
| $C$ | 9.307057 | 7.812429 |
| $R^2$ | 0.590822 | 0.535689 |

**Note**: The values in the parentheses are the probabilities of rejecting the null hypothesis of significance. The symbols of ***, ** and * indicates the rejection of null hypothesis at 1%, 5% and 10% significance level respectively.

of USD0.03 of Karex's.

In summary, the significant product characteristics for Malaysian companies supply of condom to GFATM recipients are HIV prevalence and being an African country. For product characteristics, average quantity divided by distance between Malaysia and recipient country, and average unit price of below USD0.07 were significant.

## 4. Conclusion

The increased analysis and discussion of these country and product characteristics based on data on public domain (for increased transparency) has noticeable effect towards more efficient supply process. Suppliers or aspiring suppliers may supply condoms for social cause to the recipients in countries that need them at product characteristics most required, thus also contribute to more efficient tender and supply process. A perspective from the suppliers' side also provides further discussion to previous studies that analysed GFATM purchases and procurement. Previous discussions [8, 14] have also highlighted that greater discussion and analysis of Global Fund procurement and unit prices provides input for better decision making, and more efficient used of funds to tackle the issue of HIV/AIDS especially in low and middle-income countries.

A noticeable limitation of this study is the ability to only identify Malaysian companies (based on data from MREPC) and not other supplier from other countries, respectively. More discussion on Global Fund procurement and supplies can be explored either in terms of grant recipients or in terms of allowing suppliers to understand the needs of recipients. As more companies obtain better clarity of the needs and the characteristics of products and recipient countries, a more efficient supply of condoms and other medical devices under GFATM and other aid organisations can take place, which will finally benefit the target recipients.

## References

[1] GFATM, Sourcing & Management of Health Products, Available from: https://www.theglobalfund.org/en/sourcing-management/ (assessed 26 June 2018).

[2] Joint United Nations Programme on HIV/AIDS, UNFPA, WHO and UNAIDS: Position statement on condoms and the prevention of HIV, other sexually transmitted infections and unintended pregnancy.

[3] Malaysian Rubber Export Promotion Council. Industry Overview. Available from: http://www.mrepc.com/industry/world_production.php (assessed 26 June 2017).

[4] S. Radelet, B. Siddiqi, Global Fund grant programmes: an analysis of evaluation scores, The Lancet 369 (9575) (2007) 1807 – 1813.

[5] C. Lu, C. M. Michaud, K. Khan, C. J. Murray, Absorptive capacity and disbursements by the Global Fund to Fight AIDS, Tuberculosis and Malaria: analysis of grant implementation, The Lancet 368(9534) (2006) 483 – 488.

[6] R. Hecht, L. Bollinger, J. Stover, W. McGreevey, F. Muhib, C. E. Madavo, D. de Ferranti, Critical choices in financing the response to the global HIV/AIDS pandemic, Health Affairs 28 (6) (2009) 1591 – 1605.

[7] GFATM, Update on the Price and Quality Reporting (PQR) System, Geneva, Switzerland, 2010.

[8] F. Wafula, A. Agweyu, K. Macintyre, Trends in procurement costs for HIV commodities: A 7-year retrospective analysis of global fund data across 125 countries, JAIDS Journal of Acquired Immune Deficiency Syndromes 64(4) (2014) e134 – e1349.

[9] The Hindustan Times, Ethiopia to throw away 69 million poor quality condoms 'made by Indian company', The Hindustan Times, 2016

[10] The Herald, Donors Expose Ghana In US\$ 6 Million Fake Condoms Dirty', The Herald, 2013

[11] N. Martindale, Namibian government ends condom contract with Comex', The Herald, 2010.

[12] Karex Berhad, Annual Report Karex Berhad 2017, Kuala Lumpur, 2017.

[13] J. Stover, J. E. Rosen, M. N. Carvalho, E. L. Korenromp, H. S. Friedman, M. Cogan, B. Deperthes, The case for investing in the male condom, PloS One 12(5) (2017) e0177108.

[14] A. Vasan, D. Hoos, J. S. Mukherjee, P. E. Farmer, A. G. Rosenfield, J. H. Perriëns, The pricing and procurement of antiretroviral drugs: An observational study of data from the Global Fund, Bulletin of the World Health Organization 84 (2006) 393 – 398.

[15] Karex Berhad, Fast Facts, Kuala Lumpur, 2015.

[16] Thai Nippon Rubber Industry (TNR), Information Memorandum, Bangkok, 2016.

[17]  M. T. Jallow, L. Li, M. Auton, M. Xu, Global Fund & CC-CMHPIE Supplier Conference, GFATM, Beijing, 2017.

[18]  World Bank, International Economics Dept., Development Data Group, World Development Indicators, World Bank, 2016.

[19]  A. Bell, K. Jones, Explaining fixed effects: Random effects modeling of time-series cross-sectional and panel data, Political Science Research and Methods 3(1) (2015) 133 – 153.

[20]  M. Hujala, H. Arminen, R. C. Hill, K. Puumalainen, Explaining the shifts of international trade in pulp and paper industry, Forest Science 59(2) (2013) 211 – 222.

[21]  T. Mayer, S. Zignago, CEPII Distance data, Centre D'Etudes Prospectives et D'Informations Internationales, Available from: http://www.cepii.fr/anglaisgraph/bdd/distances.htm. (accessed 2006).

## Appendix

**Table 6.** List of recipient countries in the supply of contraceptives by Malaysian companies, 2008–2013.

| | |
|---|---|
| Albania | Mauritius |
| Armenia | Mongolia |
| Bangladesh | Morocco |
| Bolivia | Myanmar |
| Bosnia & Herzegovina | Nicaragua |
| Bulgaria | Niger |
| Burundi | Pakistan |
| Cambodia | Panama |
| Cape Verde | Paraguay |
| Central African Republic | Philippines |
| Colombia | Russia |
| Congo | Rwanda |
| Gambia | Serbia |
| Guatemala | Sierra Leone |
| Guinea | Swaziland |
| Guinea-Bissau | Tajikistan |
| Guyana | Tanzania |
| Honduras | Thailand |
| Indonesia | Togo |
| Iran | Tunisia |
| Kazakhstan | Ukraine |
| Macedonia | Uzbekistan |

**Source**: Author's compilation based on data from Global Fund Price and Quality Reporting
**Note**: Arranged according to alphabetical order