Innovative financing instruments for global health 2002–15: a systematic analysis

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Development assistance for health (DAH), the value of which peaked in 2013 and fell in 2015, is unlikely to rise substantially in the near future, increasing reliance on domestic and innovative financing sources to sustain health programmes in low-income and middle-income countries. We examined innovative financing instruments (IFIs)—financing schemes that generate and mobilise funds—to estimate the quantum of financing mobilised from 2002 to 2015. We identified ten IFIs, which mobilised US$8·9 billion (2·3% of overall DAH) in 2002–15. The funds generated by IFIs were channelled mostly through GAVI and the Global Fund, and used for programmes for new and underused vaccines, HIV/AIDS, malaria, tuberculosis, and maternal and child health. Vaccination programmes received the largest amount of funding ($2·6 billion), followed by HIV/AIDS ($1080·7 million) and malaria ($1028·9 million), with no discernible funding targeted to non-communicable diseases.

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Introduction

The global economic crisis has adversely affected development assistance for health (DAH). From a peak in 2013 at US$38 billion, DAH fell to $36·3 billion in 2015.[1] Financing channelled via bilateral and multilateral agencies—the traditional sources of financing—followed a similar trajectory; UN agencies accounted for 27·6% of DAH in 1990, which fell to 12·4% by 2015, and funding from development banks declined from 18·6% of DAH in 2000 to 8·6% in 2015.[1] These trends are concerning. The trajectory of flat financing will likely continue into the future[2] and will increase the reliance on domestic and innovative financing sources to sustain and scale health programmes in low-income and middle-income countries (LMICs).

Building on previous reviews,[3–5] an earlier study[6] has defined innovative financing mechanisms as institutions such as the Global Fund to Fight AIDS, Tuberculosis and Malaria[7] and GAVI[8] that link different elements of the financing value chain to mobilise, pool, channel, and allocate resources to health programmes in LMICs. These mechanisms are distinct from innovative financing instruments (IFIs)—financing schemes that generate and mobilise funds.

Innovative financing gained prominence following the International Conference on Financing for Development in Monterrey, Mexico, in 2002,[9] as a means to provide additional financing for global health. With the commitment to the Millennium Development Goals (MDGs),[10] the Taskforce on Innovative International Financing for Health Systems was established, which identified several innovative financing sources as promising alternatives for supplementing DAH in attaining the MDGs and addressing the growing non-communicable disease burden in LMICs.[11] Innovative financing for the social sectors is forecast to grow rapidly to reach $500 billion over a 10 year period.[12]

We aimed to identify and explore in detail the IFIs used to generate international financing for global health. First, we identify IFIs that have been successfully used to mobilise funds. Second, we analyse the nature of the innovation for each instrument and map them along the financing value chain. Third, we estimate the funds mobilised by each IFI and applied for use. We do not assess the impact of the IFIs on health outcomes, as no systematic data are available to estimate direct benefits of innovative financing on health outcomes.

Methods

We did a systematic review of published studies and analysed data from international funding institutions and publicly available databases on DAH, for example from the Organisation for Economic Cooperation and Development[13] (OECD; appendix pp 2–6).

We searched peer-reviewed literature published between 2002 and 2016, the period coinciding with the establishment of innovative financing mechanisms, the creation of IFIs,[4] and for which published financing data exist. We used database-specific search strings (appendix pp 2–6) to search MEDLINE, Embase, Cochrane Library, and WHO Library Database (WHOLIS). We also used several grey literature sources, including Google Scholar, the OECD Library, and the World Bank eLibrary to identify relevant published studies.

For the selection of IFIs, we used predefined inclusion and exclusion criteria, which included: funding must be from new sources and not from traditional donor financing; IFI must be specific to health; the value of funds raised, committed, and disbursed using the instrument must be known; the IFI must have continued operation for at least 2 years; reliable data must be available; and mobilisation of funds should be in the study period 2002–15 (appendix pp 2–6).

We analysed each IFI to ascertain their characteristics and mapped them along the financing value chain (resource mobilisation, pooling, channelling, resource allocation, and implementation). We calculated for each IFI the amount of funding mobilised and invested by

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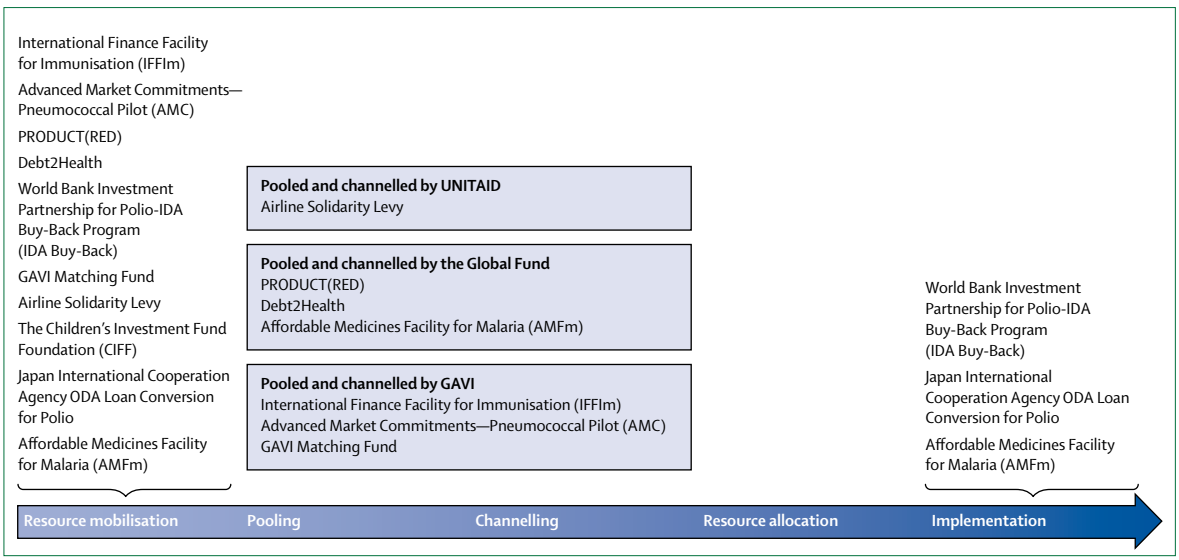

Figure 1: **Value chain mapping of ten selected innovative financing instruments**

each IFI each year over the period 2002–15 in total and to different disease areas. For instruments whose disbursement data were not available, we assumed that revenues raised during a fiscal year were disbursed in whole during that year.

We computed the revenues generated and the disbursements made using yearly financial reports and account statements of institutions either managing the IFI or channelling the funds generated by the IFI. We estimated the volume of funds contributed by each IFI to different diseases or health areas and channelled to innovative financing mechanisms. We verified the revenues and disbursements related to IFIs with data from secondary sources—for example, where funding qualified as official development assistance, we used the OECD creditor reporting system[14] or databases on international health financing.[15]

We standardised all monetary amounts to 2010 US dollar equivalents using the World Bank official exchange rates[16] and the GDP deflator indices from the US Department of Commerce, Bureau of Economic Analysis, National Income Product Accounts Tables,[17] and report our findings by calendar year. In cases where funds were reported by fiscal year, we standardised reporting by pro-rating the funding amount over a 12-month calendar period.

Findings

From the systematic review we identified 14 potential IFIs and provide a complete list in the appendix (p 6). Four of these instruments were excluded from the final analysis because they were not established as functioning entities, were established and then terminated, were not functioning, or had failed to generate meaningful revenues.

We then selected ten instruments that fulfilled our inclusion criteria (appendix pp 2–6). These were (in alphabetical order): the Advanced Market Commitments Pilot for Pneumococcal Disease (AMC),[18] the Affordable Medicines Facility for Malaria (AMFm),[19,20] the Airline Solidarity Levy (Airline Levy),[21] the Children's Investment Fund Management[22] that financed the Children's Investment Fund Foundation (CIFF),[23] Debt2Health,[24,25] the GAVI Matching Fund,[26] the International Finance Facility for Immunisation (IFFIm),[27] the Japan International Cooperation Agency ODA Loan Conversion Program for Polio (ODA Loan Conversion),[28] PRODUCT(RED),[29] and the World Bank Investment Partnership for Polio International Development Assistance Buy-Back Program (IDA Buy-Back).[30]

We provide a detailed summary of each IFI and their characteristics in the appendix with respective revenues and disbursements (appendix pp 14–18). The ten IFIs identified operate along one or more stages of the value chain, with all operating at the resource mobilisation stage (figure 1). Eight of the IFIs (IFFIm, AMC, PRODUCT(RED), Debt2Health, GAVI Matching Fund, Airline Levy, AMFm, and Children's Investment Fund Management) operate at the resource mobilisation and pooling or channelling stages. Seven of these eight IFIs pool and channel funds via GAVI, the Global Fund, or UNITAID—the three innovative financing mechanisms that have reached global scale.[16] CIFF pools and channels the funds it receives from Children's Investment Fund Management. Three IFIs (IDA Buy-Back, ODA Loan Conversion, and AMFm) operate at resource mobilisation and implementation stages, to increase the availability of funding for targeted health interventions (AMFm) or for performance-based funding (IDA Buy-Back and ODA Loan Conversion). AMFm also operates at the resource allocation stage, by influencing the price and availability of selected malaria treatments and by stimulating their consumption. AMC operates at three stages of the value

chain, including in the resource allocation stage, to signal availability of funding for pneumococcal vaccines, stimulate demand, and encourage new organisations to enter the market and manufacture these products.

Between 2002 and 2015, the ten IFIs generated about $8·9 billion in revenues and disbursed $7·5 billion (table). The Children's Investment Fund Management generated the highest amount of cumulative revenue of $2·6 billion (table, figure 2). The GAVI Matching Fund generated the least revenue, amounting to $55·4 million. The cumulative revenue generated by the remaining eight instruments ranged from $96·2 million (Debt2Health) to $2·2 billion (IFFIm), with an average of $780·1 million (SD 781·9).

The source of revenue varied by instrument and in cases where sources were similar, we analysed such instruments together. For instance, PRODUCT(RED) and the Airline Levy generate revenue through direct contributions via retail sales; for IFFIm, AMC, and AMFm, revenues come from contributions from governments and charitable foundations; for IDA Buy-Back and ODA Loan Conversion, it is the portion of the loan or credit converted and available for pooling or channelling. The Children's Investment Fund Management, which manages hedge funds, is the revenue source for CIFF.

The revenues from the Children's Investment Fund Management for CIFF rose from $674·9 million in 2007 to $943·3 million in 2008, then fell to around $81·5 million each year from 2009 to 2011, following the global economic crisis, eventually stabilising around $175 million between 2012 and 2015 (table). In 2006–15, health-related disbursements of CIFF that targeted child survival, nutrition, and early child development were $460·3 million.

PRODUCT(RED) and the Airline Levy revenues and disbursements followed a similar pattern. For the Airline Levy, the peak revenue of $345·3 million in 2007 was followed by a fall to $194·2 million in 2009 (table). PRODUCT(RED) revenues rose from $12·5 million in 2006 to $69·3 million in 2008, and fell to $19·1 million in 2009, plateauing thereafter to an average of $26·7 million (SD $16 million) in the period 2010–15.

For IFFIm, the largest disbursement was $560·2 million in 2006 (frontloaded to make available large funding for rapid roll-out of new or existing vaccines, with revenues steadily generated via bond issuance—the so called vaccine bonds), gradually declining thereafter to $445·4 million in 2007 and $278·1 million in 2008, then to $96·2 million in 2012 and $189·3 million in 2013. IFFIm did not disburse any discernible funds in 2014 and 2015 (table).

For AMC, disbursements grew rapidly from $42·9 million in 2010 to $215 million in 2012, then steadied to $203 million by 2013. Revenues also grew rapidly from inception, from $51·2 million in 2008 to $173·1 million in 2009, and remained cyclical between $173·1 million and $114·1 million (in 2010) through 2013, with $804·8 million generated between 2011 and 2015 (table).

Table: **Innovative financing: annual, cumulative revenues, and disbursements by instrument, 2002–15**[31–37]

	2015		2014		2013		2012		2011		2010		2009		2008		2007		2006		2003-05		Cumulative	
	Rev ($M)	Dis ($M)	Rev ($M)	Dis ($M)	Rev ($M)	Dis ($M)	Rev ($M)	Dis ($M)	Rev ($M)	Dis ($M)	Rev ($M)	Dis ($M)	Rev ($M)	Dis ($M)	Rev ($M)	Dis ($M)	Rev ($M)	Dis ($M)	Rev ($M)	Dis ($M)	Rev ($M)	Dis ($M)	Rev ($M)	Dis ($M)
IFFIm	Imp	0·0	Imp	0·0	290·7	189·3	224·2	96·2	182·6	293·9	181·9	320·0	169·2	334·0	139·8	278·1	72·0	445·4	21·8	560·2	NO	NO	1282·2*	2517·2
AMC	Imp	113·2	Imp	221·1	151·9	203·0	123·4	215·0	168·7	125·6	114·4	42·9	173·1	0·0	51·2	0·0	NO	NA	NO	NO	NO	NO	782·7†	920·8
PRODUCT (RED)	22·1	22·1	59·2	59·2	18·9	18·9	17·8	17·8	21·1	21·1	21·1	21·1	19·1	19·1	69·3	69·3	43·6	43·6	12·5	12·5	NO	NO	304·7	304·7
Debt2-Health	9·0	9·0	5·3	5·3	3·8	3·8	17·1	17·1	23·5	23·5	14·9	14·9	14·4	14·4	8·2	8·2	NO	NO	NO	NO	NO	NO	96·2	96·2
IDA Buy-Back	0·0	0·0	0·0	0·0	36·9	36·9	34·8	34·8	32·9	32·9	51·4	51·4	50·5	50·5	9·3	9·3	50·4	50·4	68·1	68·1	79·6	79·6	413·9	413·9
GAVI Matching Fund	Imp	Imp	Imp	Imp	Imp	Imp	28·2	28·2	12·7	12·7	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	40·9‡	40·9‡
Airline Levy	106·7	106·7	105·1	105·1	150·9	150·9	148·9	148·9	158·8	158·8	212·6	212·6	194·2	194·2	256·4	256·4	345·3	345·3	NO	NO	NO	NO	1678·9	1678·9
AMFm	0·0	41·4	97·6	80·0	94·7	106·0	116·2	134·9	0·0	120·9	121·1	0·9	91·8	0·0	NO	NO	NO	NO	NO	NO	NO	NO	521·4	484·1
ODA Loan	20·1	20·1	48·3	48·3	0·0	0·0	48·8	48·8	18·2	18·2	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	135·4	135·4
CIFF	223·1	260·5	174·7	211·6	147·8	145·1	154·5	110·4	88·3	83·8	68·2	28·3	88·1	5·9	943·3	30·0	674·9	12·1	NO	NO	NO	NO	2562·9	887·7
Total																							7819·2§	7479·8¶

$M=US dollars in millions. Rev=revenue. Dis=disbursement. Imp=imputed. NA=not available. NO=not operational. AMC=Advanced Market Commitments Pilot for Pneumococcal Disease. AMFm=Affordable Medicines Facility for Malaria. Airline Levy=Airline Solidarity Levy. CIFF=Children's Investment Fund Foundation. IFFIm=International Finance Facility for Immunisation. ODA Loan Conversion=Japan International Cooperation Agency ODA Loan Conversion Program for Polio. IDA Buy-Back=World Bank Investment Partnership for Polio International Development Assistance Buy-Back Program. Cumulative revenues and disbursements with adjustments (after imputing) were unchanged except: *revenues $2249 million; †revenues $841·1 million; ‡revenues and disbursements $55·4 million; §total revenues $8803·5 million; ¶total disbursements $7438·9 million.

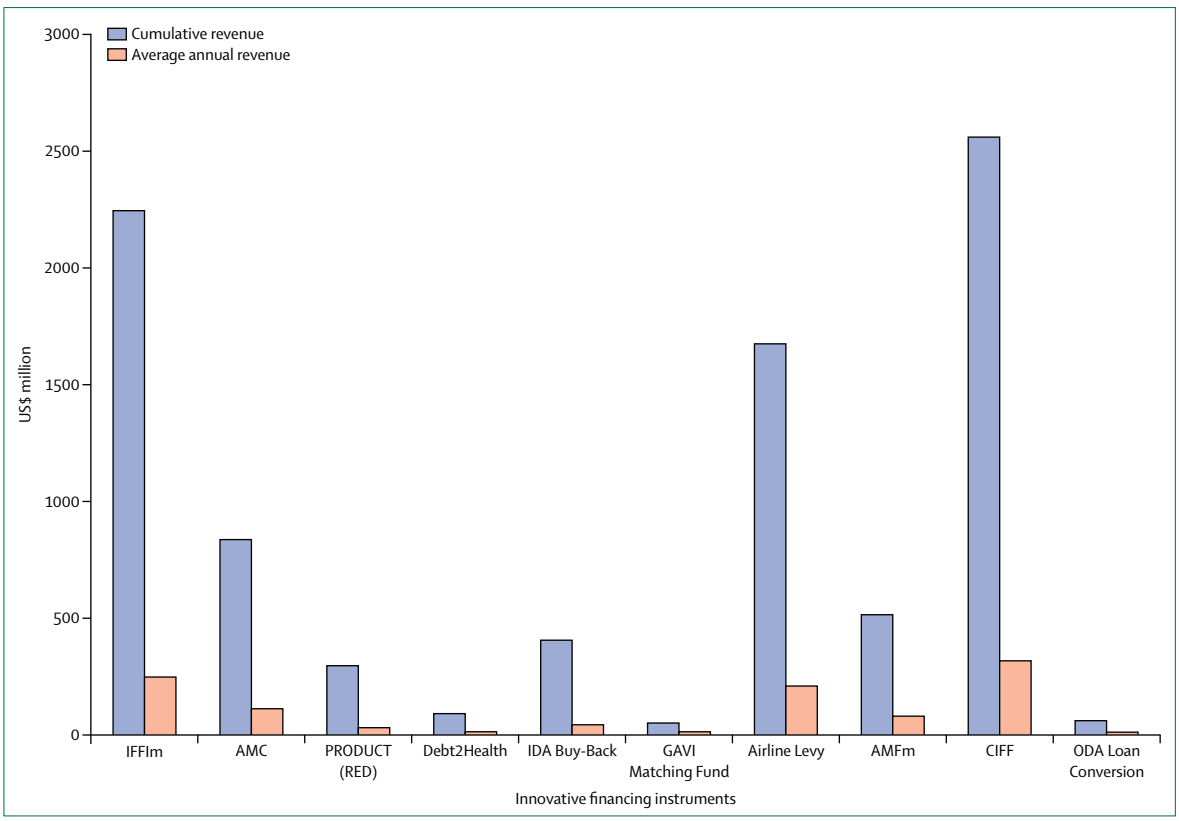

Figure 2: **Innovative financing: cumulative and average annual revenues by instrument, 2002–15**
AMC=Advanced Market Commitments Pilot for Pneumococcal Disease. AMFm=Affordable Medicines Facility for Malaria. Airline Levy=Airline Solidarity Levy. CIFF=Children's Investment Fund Foundation. IFFIm=International Finance Facility for Immunisation. ODA Loan Conversion=Japan International Cooperation Agency ODA Loan Conversion Program for Polio. IDA Buy-Back=World Bank Investment Partnership for Polio International Development Assistance Buy-Back Program.

AMFm revenues increased from $91·8 million at the start in 2009 to $121·1 million in 2010, declined in 2011 ($0), and rose to $116·2 million in 2012, then declined to $94·7 million in 2013. Cumulative disbursements to the six countries involved in the AMFm programme and subsidised buyer co-payments were $484·1 million in total: $0·9 million in 2010, $120·9 million in 2011, $134·9 million in 2012, $106 million in 2013, $80 million in 2014, and $41·4 million in 2015 (table).

The revenue and disbursement trends for debt conversion and debt buy-back instruments (Debt2Health, IDA Buy-Back, and ODA Loan Conversion) reflected debt conversion payments, as per the agreed buy-back arrangements.[38] We did not analyse the GAVI Matching Fund (established in 2011) due to limited publicly available data.

The largest proportion of the funding mobilised by the IFIs was pooled at GAVI, the Global Fund, and UNITAID, and allocated to vaccination programmes including triple vaccines (diphtheria, tetanus, and pertussis), *Haemophilus influenzae* type b, measles, hepatitis B, rotavirus, and yellow fever ($2·6 billion; 42·2% of total), HIV/AIDS ($1080·7 million; 17·7% of total), malaria ($1028·9 million; 16·9% of total), and pneumococcal vaccine ($484·1 million; 7·9% of total). About $482·5 million (7·9% of total) were mobilised for oral polio vaccines, $335·8 million (5·5% of total) for tuberculosis, and $117·5 million (1·9% of total) for crosscutting activities, such as health system strengthening. Between 2007 and 2015, CIFF disbursements for interventions targeting neonatal mortality, deworming, prevention of severe acute malnutrition, and prevention of mother-to-child transmission of HIV/AIDS amounted to $460·3 million (51·3% of total disbursements; appendix p 9).

About $3·6 billion (34·1% of total funds) of cumulative funding pooled and channelled by GAVI between 2006 and 2015 was generated from AMC, IFFIm, and the GAVI Matching Fund. Since 2006, GAVI has increased the amount of funding and the number of IFIs from which it generates revenues (appendix p 10–11).

For the Global Fund, funding from IFIs (Debt2Health, AMFm, and PRODUCT(RED)) accounted for $922 million, or 2·9% of the total funding ($31·8 billion) mobilised between 2006 and 2015, representing a small fraction of overall resources as compared with GAVI. The funds mobilised by the Global Fund from IFIs have been volatile, with the amount increasing from $12·5 million in 2006 to $157·1 million in 2010, but declining sharply to $44·6 million in 2011. Whereas funding received from IFIs rose in 2012 to $151·1 million, it fell in 2013 to

$117·4 million, recovering in 2014 to $162·1 million but falling sharply again to $31·1 million due to AMFm not generating discernible revenues in 2015 (appendix p 12).

The Airline Levy generated the largest amount of funding for UNITAID, amounting to $1·7 billion between 2007 and 2015, and accounting for 67% of its total revenues. UNITAID received about $345·3 million from the Airline Levy in 2007 (90% of revenues) and $256·4 million in 2008, stabilising thereafter to reach $106·7 million in 2015 (88·7% of revenues; appendix p 13).

Discussion

Of the ten IFIs we identified as having successfully mobilised new funds, seven (the Airline Levy, AMC, Children's Investment Fund Management, Debt2Health, IDA Buy-Back, IFFIm, and PRODUCT(RED)) have consistently generated revenue for at least 5 years, signalling promise as sustainable arrangements. Their association with international innovative financing mechanisms such as GAVI, the Global Fund, and UNITAID, stand to guarantee continued success as well as facilitate rapid pooling and channelling to beneficiary countries.

In mapping the ten IFIs along the financing value chain, the concentration along the resource mobilisation function, as well as the relative absence along other functions, such as channelling (eg, to disease or thematic areas) and resource allocation (eg, using priority setting approaches, country-led requests, or performance-related funding [used by the Global Fund]), suggests opportunities for innovation.

The financial profiles of the instruments show substantial variations in revenues and disbursements. Resources for IFIs have generally declined since 2009. Revenues typically peaked soon after introduction, then plateaued to lower but stable levels and remained pro-cyclical, with increases during strong economic growth and reductions during the economic downturn that followed the global economic crisis (Airline Levy, Children's Investment Fund Management, and PRODUCT(RED)). With IFFIm, AMC, and AMFm, revenues and disbursements were used to influence market dynamics for the health products targeted: IFFIm used revenues to frontload disbursements to establish immunisation programmes in countries and purchase vaccines, with disbursements steadily tapering in later years; AMC had a pattern of revenue generation and disbursement, reflecting its funding replenishment scheme that relies on a combination of fixed-payment and intermittent donor contributions[39] and AMFm revenues were generated yearly and pooled to make available large funding for antimalarial drugs to secure price reductions from manufacturers and provide upfront disbursements to countries to enter into purchase commitments.[40]

The international innovative financing mechanisms have effectively pooled and channelled financing from IFIs to beneficiary countries. For example, GAVI achieved a steady growth in its income since 2006 and successfully used IFIs to mobilise $3·5 billion, accounting for 33·4% of its total revenues, which it invested in immunisation programmes against vaccine preventable diseases in children. The Global Fund mobilised less than GAVI using IFIs, securing around $922·2 million in total, which accounted for 2·9% of its total revenues in 2006–15. Innovative instruments such as exchange traded funds, which were introduced by the Global Fund[41] failed to generate any meaningful amount of funding. The Airline Levy, a successful IFI, has become a large and steady source of revenues for UNITAID, which has diversified its income to mitigate fluctuations in revenues from Airline Levy.

Financing from IFIs has been primarily channelled to global financing mechanisms such as GAVI, Global Fund, and UNITAID for new and underused vaccination programmes, HIV/AIDS, tuberculosis, malaria, as well as pneumococcal disease and oral polio vaccines, with only a small fraction used for health system strengthening. There were no funds allocated to non-communicable diseases from the ten IFIs analysed. Given the growing burden in LMICs, it will be essential to identify both innovating mechanisms and instruments to fund efforts against non-communicable diseases, which will only be possible if there are efforts by civil society, relevant associations, and the non-communicable disease community to generate global activism to mobilise political commitment for new funds.[42,43] Equally important is maternal and reproductive health for which funding partnerships such as the Global Financing Facility[44] can draw upon the successes of GAVI and the Global Fund, and the IFIs identified.

The ten IFIs analysed collectively accounted for around $8·9 billion (2·3%) of the $391·4 billion in DAH generated between 2002 and 2015, and have the potential to attain larger scale. Much of the new funding raised using IFIs were channelled through GAVI, the Global Fund, and UNITAID, thereby reducing fragmentation in an already crowded funding landscape. One might argue that funding for AMC and AMFm is a new way of using traditional donor financing, and Debt2Health represents a new way of debt forgiveness, and that the monies might not be additional. However, there is no way of ascertaining, in the absence of IFIs, whether donors would have made these new funds available for health.

In addition to innovative financing, there are several encouraging initiatives, such as the World Bank Health Results Innovative Trust Fund,[45] the Grand Challenge mechanisms in health,[46] and the Global Innovation Fund[47] supported by the Governments of Australia, Sweden, the UK, and the USA, that provide new opportunities for channelling traditional donor funding in novel ways to improve global health. These are likely to increase in prominence as donors look for more impactful and demonstrable ways of investing their funds.

There is a risk to sustaining innovative financing. Since the economic crisis, debt relief or securitisation have become unpopular—with debt relief because of controversies on whether the OECD Donor Assistance Committee will count the funding as official development assistance. Further, securitisation mechanisms like IFFIm are difficult for some donors such as the USA and Japan to accommodate in their budget systems.[48] Further, in an environment of economic instability, governance risks in low-income countries, and the challenges in generating substantial economic benefit to private investors, mean that large-scale involvement of the private sector in innovative financing might be difficult. As with any new funding there is a risk of innovative financing crowding out other (and domestic) sources of funding.[49,50] This risk is why shared responsibility, as articulated by the African Union,[51] and others,[52] is crucial to sustain and increase funding for health in LMICs. Given the increasing importance of IFIs there is a need for evaluative studies to ascertain their effect on crowding out domestic sources of funding and their health impact.

As the funding from traditional sources of external funding flattens, with the risk of a likely decline in the future,[4] much of the future funding for global health will come from domestic sources. In addition to innovative financing and novel ways of channelling traditional donor funds, shared responsibility for funding health is an imperative. In many LMICs, the funding gap between obligations and available funds will likely widen, requiring new sources of financing beyond those that can be met domestically or from traditional donor sources.[53,54]

Although the absolute levels and the proportion of global funding from innovative financing has been modest, this share is expected to grow, especially if new IFIs such as Financial Transaction Tax,[55] which will likely be introduced in Europe,[56] can be used to address global health challenges.[57] As LMICs scale up towards universal health coverage, sustained financing will become crucial. Our work is timely in contributing to that dialogue, as the global community works to achieve a "grand convergence" in health, as championed by the *Lancet* Commission on Investing in Health,[58] and to leave no one behind, as aimed for in the Sustainable Development Goals.[59]

Contributors

RA conceived the study and oversaw the study. SS led the data collection and analysis with guidance from RA. RA and SS wrote the first draft. RA and SS wrote the final manuscript with input from FMK. All authors approved the final manuscript. The corresponding author had full access to the data and had final responsibility for the decision to submit for publication.

Declaration of interests

We declare no competing interests.

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