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Does recession reduce global health aid? Evidence from 15 high-income countries, 1975–2007

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Objective To test the hypothesis that economic recessions lead to reduced global development assistance for health (DAH).

Methods Data obtained from the Creditor Reporting System of the Organisation for Economic Co-operation and Development (OECD) for 15 OECD countries were used to model the percentage change (relative difference) in commitments and disbursements for DAH as a function of three measures of economic recession: recessionary year (as a dummy variable with 0 for no recession and 1 for recession), percentage change in per capita gross domestic product and percentage point change in unemployment rate for recessionary cycles from 1975 through 2007. We looked for an association both during the concurrent recessionary year and one and two years later.

Findings No statistically significant association was found in the short or long run between measures of economic recession and the amount of official DAH committed or disbursed.

Conclusion Any important decrease in overall DAH following the current economic recession would have little historical precedent and claims of inevitability would be unjustifiable.

Abstracts in عربي, 中文, Français, Русский and Español at the end of each article.

Introduction

There is fear that the ongoing global economic recession will lead high-income countries to reduce commitments or disbursements for development assistance for health (DAH). The World Bank's chief economist for Africa, noting that the Group of Eight failed to meet its 2005 commitment to double aid to Africa, has expressed this fear as follows: "If during the boom period they were unable to meet these commitments, I'm wondering what is going to happen now that we're in a deep recession."[1]

Yet so far the issue remains controversial. Although development assistance has been relatively protected from cuts since the start of the 2008 economic recession, many industrialized countries are now embarking on severe austerity measures. Some, such as the United Kingdom of Great Britain and Northern Ireland, have stated that they will protect overseas development assistance; others have been less explicit. Italy and Ireland have reduced their allocations for development assistance by 56% and 10%, respectively,[2] while other countries, such as Germany and the United States of America (USA), increased their spending on development assistance when the current financial crisis arose.[3] Australia's AusAID has shown sustained commitment by creating a Global Economic Crisis Taskforce to support recipient countries facing additional economic problems resulting from the financial crisis.[4] Despite a General Assembly resolution stating that the United Nation's central emergency response fund should receive 500 million United States dollars (US$) annually to address disasters such as the earthquake in Haiti and the floods in Pakistan, only US$ 358 million were raised for the current year. China, despite being the world's second-largest economy, pledged US$ 500 000; Italy promised US$ 1 500 000.[5]

Non-state actors such as the Bill & Melinda Gates Foundation, the William J Clinton Foundation and the Carter Center also play an important role in determining financial flows to global health programmes. Endowments invested in equities may also be adversely impacted by recession. Grants (for all purposes) made by foundations based in the United States fell by 8.9% in 2009,[6] creating concerns about delayed implementation or disbursement of funds as well as potential future reductions in funding. Uncertainty in future funding can greatly affect the capacity of global agencies such as the World Health Organization (WHO) to plan global health programmes effectively.

An overall reduction in commitments or disbursements could be particularly destabilizing for countries that use such aid to support ongoing health-care infrastructure development or to sustain existing health-care programmes[7] Among African nations, more than one-third of annual health spending may come from donor financing.

In this paper we examine what has happened during previous economic downturns and hypothesize that recessions lead to declines in official DAH. To test this hypothesis, we examined the records of 15 high-income European Union countries belonging to the Organisation for Economic Co-operation and Development (OECD) for the period between 1975 and 2007.

Methods

We investigated the relationship between economic downturns and the official DAH committed and provided by 15 OECD countries between 1975 and 2007 using data from the Creditor Reporting System.[8] The countries included were Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden and the United Kingdom of Great Britain and Northern Ireland. We identified economic downturns in three ways. As a first step we dated business cycles drawing on the methods specified

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by Camacho et al.[9] As a second step we detected fluctuations in per capita gross domestic product (GDP) expressed in purchasing-power-parity dollars (i.e. the economic growth rate in percentage terms, which is effectively the same as taking the difference in the natural log of successive measures of GDP).[10] As a third step we attempted to measure not just whether or not a recession existed (coded dichotomously, yes or no), but also its depth and scale. To do so we used continuous measures, such as the unemployment rate, to correlate the severity of the recession with the degree of reduction in DAH. The importance of this step is exemplified by the current recession in the USA: if GDP alone is used as a measure of a downturn (standard practice by the National Bureau of Economic Research), the USA appears to be out of recession, since as we write its GDP is again rising. However, this would fail to capture the economic hardship confronting ordinary people who are losing jobs, a factor that is likely to influence political debates on global aid commitments. Specifically, job loss may put pressure on policy-makers to increase domestic social welfare expenditure over international aid. Thus, our third measure of the severity of the crisis was captured by fluctuations in unemployment rates.

We modelled the percentage change (relative difference) in commitments and disbursements for DAH as a function of each of the three economic variables described in the previous paragraph (a method of first-differences, although our results were consistent when we modelled using the current year's levels of aid and the absolute yearly differences rather than yearly percentage changes). The rationale for using a percentage difference equation was twofold: first, we hypothesized that a recession (a negative change in GDP) would result in a reduction in DAH (a negative change in DAH); second, our statistical tests suggest that the data series are weakly integrated (using Dickey-Fuller tests), which indicates that there is trending in the pre-2008 data. Had we evaluated the level of aid instead, we could have found spurious associations with the state of the economy, as both the GDP and DAH were rising relatively steadily for reasons that may be causally unrelated. As a further robustness check we added a trend variable to account for the longer-term pattern of rising DAH in response to the scaling up of targets for global aid, which enabled us to better isolate the association of a recession with changes in aid. Finally, to mitigate the impact of small numbers and zero values (for the 69 country–years in which no health aid was committed), we constrained the sample to more than a doubling in funding for DAH, although we also found that this constraint had no effect on the results.

Our basic model was thus:

$$\Delta H_{i,t} = \alpha + \beta \mathrm{REC}_{i,t} + \varepsilon_{i,t}$$

where i is the country, t is the year, ΔH represents the percentage change in commitments or disbursements for DAH (i.e. rate of growth), REC includes a series of measures of economic downturn (including the economic growth rate and percentage point changes in unemployment rate) and ε is the error term. To reflect the fact that countries were not independently sampled, we clustered standard errors (SEs) for robustness to autocorrelation (noting that autocorrelation affects the SE but does not bias the coefficient estimate[11]). Data were analysed using STATA v 10.1 (StataCorp. LP, College Station, USA). All data and statistical codes are available from the authors upon request.

Results

Table 1 shows the results of our basic models. We found no statistically significant association between commitments in DAH on the one hand and a state of recession, fluctuations in GDP per capita or changes in unemployment rates in donor countries on the other. These findings were unchanged after holding fixed differences between countries constant (correcting for time-invariant differences in surveillance) and after accounting for longitudinal trends in DAH commitments (correcting for patterns in DAH commitment changes that were already in motion before the onset of recession; Table 1).

While countries may have remained committed to DAH, they may have disbursed less than they had committed themselves to give. Disbursements recorded between 1995 and 2007, when they were first reliably incorporated into the OECD Creditor Reporting System database, were approximately 4% lower than commitments to DAH (on average, US$ 122 per capita in commitments versus US$ 117 per capita in disbursements).[8] Overall, health commitments and health disbursements were strongly correlated ($r = 0.82$; $P < 0.0001$; number of country–years = 314). As shown in Table 2, we found no association between recessionary years, GDP downturns or unemployment increases and disbursements for health assistance; changes in disbursements for DAH correlated with changes in commitments to deliver DAH, and disbursements for DAH were not reduced during recessions.

It is, of course, possible that recessions exert a delayed effect on health spending. This may occur, for example, when budgets including commitments to deliver DAH have been set in advance for the year in which the recession occurs. Table 3 shows the results of statistical tests examining the delayed effects of the selected economic indicators on DAH. Again, we found no statistically significant association between any of the three measures of economic downturn and commitments in international assistance for health when incorporating time lags. Small negative coefficients marked the relationship between real changes in GDP and aid commitments using one- and two-year lags; however, they were not statistically or jointly significant ($F(2,14) = 0.15$; $P = 0.86$).

On the other hand, fluctuations in the previous year's employment rate were significantly associated with falls in DAH commitments. For every percentage point increase in unemployment over the previous year there was a drop of 13.8% in DAH. However, for every percentage point increase in unemployment there was a 5.7% increase in aid after a two-year lag and an 8.5% increase in aid observable in the concurrent year; cumulatively (14.1%) this cancelled out the drop in aid observed after a lag. Thus, there may be some cyclical volatility in DAH associated with economic fluctuations, although the overall change in the amount of DAH is not statistically significant.

Discussion

Overall, we found no robust evidence to support our hypothesis that recessions lead high-income countries to reduce their total DAH commitments or disbursements, either immediately after recession begins or within a two-year period. Before interpreting these findings, we must note several possible statistical reasons for the lack of a significant association between indicators of recession and aid flows. Current data samples could lack the statistical power needed to detect any effect of recession if it is small. However,

Table 1. **Measures of economic recession and their associations with the percentage change (relative difference) in commitments to deliver development assistance for health,[8] before and after adjustment for country-specific time trends, 1975–2007**

Measure of recession	Unadjusted model						Adjusted model					
	Full-country variation (pooled OLS)			Within-country variation (fixed effects)			Full-country variation (pooled OLS)			Within-country variation (fixed effects)		
	I	II	III	IV	V	VI	I	II	III	IV	V	VI
Dummy for recessionary year[a]	11.17[b] (7.76)[c]	–	–	10.95 (8.12)	–	–	14.11 (8.00)	–	–	9.64 (8.90)	–	–
Change in per capita GDP[12] (%)	–	0.45 (0.92)	–	–	0.16 (0.91)	–	–	1.39 (1.06)	–	–	1.36 (1.30)	–
Change in unemployment rate[12] (pp)	–	–	1.17 (2.55)	–	–	1.26 (2.56)	–	–	4.08 (2.56)	–	–	3.40 (2.56)
No. of country–years	199	244	250	199	244	250	199	244	250	199	244	250
No. of countries	14[d]	14[d]	14[d]	14[d]	14[d]	15	14[d]	14[d]	15	14[d]	14[d]	15
R^2 (goodness of fit for the entire model)	< 0.01	< 0.01	< 0.01	0.04	0.06	0.05	0.11	0.12	0.10	0.18	0.18	0.16

GDP, gross domestic product; OLS, ordinary least squares; pp, percentage points; none of the associations was statistically significant at $P < 0.05$ in two-tailed *t* tests.

[a] Coded as 0 for no recession, 1 for recession. Recession dating based on reference[9]. Results were consistent when all variables were included simultaneously and when absolute changes in commitments were evaluated.

[b] Beta coefficient from the statistical model indicating the percentage change in DAH. Same throughout upper portion of table.

[c] Robust standard errors are in parentheses throughout table. They are clustered by country to reflect non-independent sampling. Countries include Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden and the United Kingdom of Great Britain and Northern Ireland.

[d] Data were missing for one country.

our sample represented more than 200 country–years and is therefore highly likely to detect any effect other than a very small one. A high degree of measurement error is another possibility. All models yielded very low R^2 values, which suggests a lot of unexplained variation both within and between countries. Measurement error could also lead to attenuation bias,[13] although the Creditor Reporting System has put considerable effort into standardizing reporting to improve comparability among countries. We have also evaluated within-country variations, which would not be impacted by between-country differences in surveillance methods. Such differences are where the greatest artefactual variation in measurement is likely to occur.

We have reported the average estimated association between recessions and DAH, and the average may conceal variation in how countries respond to financial downturns. For example, Sweden's health disbursements were US$ 74 million per capita in 1990 and dropped slightly, to US$ 73 million, in 1991. However, they rose to US$ 99 million in 1992. On the other hand, Finland experienced a more substantial reduction of about one-third in GDP from 1991 to 1992 and reduced its aid commitments by a similar magnitude. Reduced commitments by some donors may be compensated for by other donor agencies, resulting in a null effect. Several non-state actors have increased aid commitments during the current recession. For example, Warren Buffett, a major donor to the Gates Foundation, saw his fortune increase by more than US$ 10 billion during 2010[14] and the overall resources available to the Gates Foundation (which depend on the stock market performance of its endowment investments) increased in 2010 after a short-term decline the previous year.[15,16] Nonetheless, WHO staff report that some foundations have taken measures to offset the possibility of a future endowment decline, such as a delayed delivery of funds and other strategies that could unintentionally disrupt the effective planning of global health programmes.[5]

The above notwithstanding, our findings suggest that high-income countries' economic performance is not likely to be a significant determinant of DAH commitments or disbursements, as shown by past experience. Instead, they point to the importance of other global health debates and to political factors in determin-

Table 2. **Measures of economic recession and their associations with the percentage change (relative difference) in disbursements for development assistance for health,[8] 1975–2007**

Measure of recession	**Full-country variation (pooled OLS)**		
	Unadjusted model[a]		
	I	**II**	**III**
Dummy for recessionary year[b]	6.66[c] (34.17)[d]	–	–
Change in per capita GDP[12] (%)	–	–0.19 (1.03)	–
Change in unemployment rate[12] (pp)	–	–	–2.97 (2.84)
No. of country–years	32	71	76
No. of countries	7[e]	15	15
R^2 (goodness of fit for the entire model)	< 0.01	< 0.01	< 0.01

GDP, gross domestic product; OLS, ordinary least squares; pp, percentage points; none of the associations was statistically significant at $P < 0.05$ in two-tailed *t* tests.

[a] Data too few to observe any change after adjustment.

[b] Coded as 0 for no recession, 1 for recession. Recession dating based on reference[9].

[c] Beta coefficient from the statistical model indicating the percentage change in development assistance for health. Same throughout upper portion of table.

[d] Robust standard errors are in parentheses throughout table. They are clustered by country to reflect non-independent sampling. Countries include Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden and the United Kingdom of Great Britain and Northern Ireland.

[e] Data were missing for several countries.

Table 3. **Measures of economic recession and their associations with the percentage change (relative difference) in commitments to deliver development assistance for health[8] during recession and 1 or 2 years after recession, 1975–2007**

Measure of recession	**Within-country variation (fixed effects model)**					
	Unadjusted model			**Adjusted model**		
	I	**II**	**III**	**IV**	**V**	**VI**
Dummy for recessionary year[a]	14.4[b] (8.71)[c]	–	–	12.9 (9.39)	–	–
Dummy for recessionary year	0.67 (8.53)	–	–	0.32 (8.08)	–	–
Dummy for recessionary year	4.96 (10.8)	–	–	10.9 (13.0)	–	–
Change in per capita GDP[12] (%)	–	0.89 (1.09)	–	–	1.52 (1.26)	–
Change in per capita GDP 1 year after recession (%)	–	–1.12 (0.89)	–	–	0.57 (1.13)	–
Change in per capita GDP 2 years after recession (%)	–	–1.80 (1.30)	–	–	0.12 (1.78)	–
Change in unemployment rate[12] (pp)	–	–	7.13* (3.13)	–	–	8.45* (3.41)
Change in unemployment rate 1 year after recession (pp)	–	–	–13.30** (3.40)	–	–	–13.80** (3.59)
Change in unemployment rate 2 years after recession (pp)	–	–	1.98 (5.24)	–	–	5.65 (5.22)
No. of country–years	195	238	244	195	238	244
No. of countries	14[d]	15	15	14	15	15
R^2 (goodness of fit for the entire model)	0.02	0.02	0.04	0.18	0.18	0.20

GDP, gross domestic product; pp, percentage points; $*P < 0.05$; $**P < 0.01$; two-tailed *t* tests.

[a] Coded as 0 for no recession, 1 for recession. Recession dating based on reference.[9]

[b] Beta coefficient from the statistical model indicating the percentage change in development assistance for health. Same throughout upper portion of table.

[c] Robust standard errors are in parentheses throughout table. They are clustered by country to reflect non-independent sampling. Countries include Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden and the United Kingdom of Great Britain and Northern Ireland.

[d] Data were missing for one country.

ing aid allocations. One contemporary risk is that donor agencies will behave in response to a political climate calling for generalized austerity that fosters the erroneous belief that a reduction in aid is the inevitable consequence of recession. Our evidence is consistent with a potential mimetic effect, whereby donors' aid decisions are influenced by those of other donors. Thus, we may be facing a self-fulfilling prophecy. Future research should investigate the factors that may be driving health aid allocations and their potential influence on the reliability of development aid. ■

Competing interests: None declared.

ملخص

هل يؤدي الركود إلى خفض المساعدات الصحية العالمية؟ البيّنات من 15 بلداً مرتفعة الدخل، 1975-2007

الغرض اختبار فرضية أن الركود الاقتصادي سيؤدي إلى خفض المساعدات التنموية العالمية الموجّهة للصحة.

الطريقة استخدمت المعطيات التي جُمعَت من نظام التبليغ الدائن لمنظمة التعاون الاقتصادي والتنمية لـ15 بلداً عضواً في المنظمة لإعداد نموذج للتغير في النسبة المئوية (الاختلاف النسبي) في الالتزام والإنفاق الخاصين بالمساعدات التنموية العالمية الموجّهة للصحة كدالة من ثلاثة قياسات للركود الاقتصادي: سنة الركود (كمتغير صوريّ قيمته 0 لعدم الركود و1 للركود)، التغير في النسبة المئوية لنصيب الفرد في الناتج المحلي الإجمالي، ونقطة التغير في النسبة المئوية لمعدل البطالة لدورات الركود من عام 1975 حتى 2007. وقد فحص الباحثون الارتباط خلال سنة الركود المتزامنة وفي سنة وسنتين تاليتين.

النتائج لم يُلاحظ ارتباط يعتد به إحصائياً على الأمد القصير والأمد الطويل بين قياسات الركود الاقتصادي وكمية المساعدات التنموية العالمية الموجهة للصحة قيد الالتزام أو الإنفاق.

الاستنتاج أي خفض هام في إجمالي المساعدات التنموية العالمية الموجهة للصحة في أعقاب الركود الاقتصادي الحالي سيشكّل سابقة تاريخية والادعاء بحتمية ذلك ليس مبرراً.

摘要

经济衰退是否会减少全球健康援助？1975-2007年来自15个高收入国家的证据

目的 旨在验证经济衰退导致全球健康发展援助（DAH）减少这一假设。

方法 利用经济合作发展组织（OECD）15个成员国的债权人报告系统得出的数据进行建模分析健康发展援助承诺和支出间的百分比变化（相对差），以经济衰退三个测量值进行函数计算。此三个测量值为：经济衰退年份（虚拟变量，0表示没有经济衰退而1表示经济衰退）、人均国内生产总值百分比变化和1975至2007年间经济衰退周期内失业率的百分点变化。我们寻找此三个测量值在现行经济衰退年份以及一两年后的关联。

结果 短期或长期内均未发现经济衰退测量值与官方承诺或支付的健康发展援助金额之间的任何显著关联。

结论 当前经济衰退之后引发总体健康发展援助的重大减少都没有什么历史先例，任何必然性的断言都是不合理的。

Résumé

La récession réduit-elle l’aide sanitaire internationale? Les preuves de 15 pays à revenu élevé sur la période 1975–2007

Objectif Tester l’hypothèse selon laquelle les récessions économiques entraînent une diminution de l’assistance au développement sanitaire (ADS) mondiale.

Méthodes Les données provenant du système de notification des pays créanciers (SNPC) de l’Organisation de coopération et de développement économiques (OCDE) de 15 pays de l’OCDE ont été utilisées pour modéliser la variation en pourcentage (différence relative) dans les engagements et les déboursements en matière d’ADS en tant que fonction des trois mesures de la récession économique: l’année de la récession (en tant que variable indicatrice avec 0 pour une absence de récession et 1 pour une récession), la variation en pourcentage dans le PIB par habitant et la variation en points de pourcentage dans le taux de chômage pour les cycles de récession de 1975 à 2007. Nous avons recherché une association lors de l’année de la récession simultanée plus une, et deux années plus tard.

Résultats Aucune association statistiquement significative n’a été constatée sur le court ou le long terme entre les mesures de la récession économique et le montant de l’ADS officiel engagé ou déboursé.

Conclusion Toute baisse importante dans l’ADS globale suivant la récession économique actuelle n’aurait que peu d’antécédent historique et toute demande d’inévitabilité ne pourrait être justifiée.

Резюме

Приводит ли рецессия к снижению глобальной помощи в области здравоохранения? Данные по 15 странам с высоким доходом, 1975–2007

Цель Проверить гипотезу о том, что экономические спады ведут к снижению глобальной помощи на нужды развития в области здравоохранения (ПРЗ).

Методы Данные, полученные от Системы отчетности перед кредиторами Организации экономического сотрудничества и развития (ОЭСР), по 15 странам – членам ОЭСР были использованы для моделирования процентных изменений (относительной разницы) в финансовых обязательствах и расходах на ПРЗ как функции трех индикаторов экономического спада: года спада (косвенной переменной со значениями 0 для отсутствия спада и 1 для спада), процентного изменения валового национального продукта на душу населения и изменения (в процентных пунктах) показателя безработицы для циклов рецессии за период с 1975 по 2007 год. Мы искали корреляцию как в текущем году, так и на протяжении одного или двух последующих лет.

Результаты Не было обнаружено статистически значимой корреляции в краткосрочной или долгосрочной перспективе между индикаторами экономического спада и объемом финансовых обязательств или затрат на официальную ПРЗ.

Вывод Какое-либо существенное снижение суммарной ПРЗ вслед за текущим экономическим спадом не имело бы исторического прецедента, и утверждения о его неизбежности были бы необоснованными.

Resumen

¿La recesión disminuye la ayuda sanitaria mundial? Datos procedentes de 15 países de ingresos elevados, durante el periodo comprendido entre 1975 y 2007

Objetivo Comprobar la hipótesis de que las recesiones económicas conllevan una disminución de la ayuda mundial para el desarrollo destinada a la salud (ADS).

Métodos Se emplearon los datos obtenidos a través del Sistema de Información Creditor de la Organización de Cooperación y Desarrollo Económicos (OCDE), procedentes de 15 países miembros de la OCDE, para determinar la variación porcentual (diferencia relativa) de los compromisos y desembolsos para la ADS, como una función de las tres medidas de la recesión económica: el año de la recesión (como una variable simulada en la que el 0 corresponde a la ausencia de recesión y el 1 a la recesión), la variación porcentual del producto interior bruto *per capita* y la variación en puntos porcentuales de la tasa de desempleo en los ciclos de recesión entre 1975 y 2007. Hemos buscado una asociación durante el año de recesión concurrente y durante uno y dos años después.

Resultados No se observó ninguna asociación estadísticamente significativa a corto o largo plazo entre las medidas de la recesión económica y el volumen de ADS oficial comprometida o desembolsada.

Conclusión Cualquier descenso considerable en la ADS mundial tras la actual recesión económica tendría escasos precedentes históricos, por lo que resultaría injustificable afirmar su inevitabilidad.

References

1. Tordjman J. *Recession weighs heavily on aid to poor countries*. Relief Web. 2009 May 24. Available from: http://www.reliefweb.int/rw/rwb.nsf/db900SID/MYAI-7SCA7Q?OpenDocument [accessed 12 January 2011].
2. *Less and worse aid? Financial crisis shows first impacts on European aid budgets*. Brussels: European Network on Debt & Development. 2009 Feb 5. Available from: http://www.eurodad.org/whatsnew/articles.aspx?id=3285 [accessed 12 January 2011].
3. Bahra P. Overseas aid hits record despite worsening recession. *The Sunday Times* (London); 2009 Mar 30. Available from: http://www.timesonline.co.uk/tol/news/world/article6003452.ece [accessed 20 January 2011].
4. Budget 2009–2010 [Internet]. *Responding to the global recession.* Canberra: Australian Government; 2010. Available from: http://www.ato.gov.au/budget/2009-10/content/ministerial_statements/ausaid/html/ms_ausaid-04.htm [accessed 20 January 2011].
5. Beaumont P. Britain accuses G20 countries of failing to contribute to disaster relief fund. *The Guardian*. London; 2010 Dec 26. Available from: http://m.guardian.co.uk/ms/p/gnm/op/sty14GgeB4Q-CN7UW24NA7A/view.m?id=15&gid=global-development/2010/dec/26/britain-accuses-g20-disaster-relief&cat=world [accessed 20 January 2011].
6. The Center on Philanthropy at Indiana University. *Giving USA 2010: the annual report on philanthropy for the year 2009*. Indianapolis: Giving USA Foundation; 2010. Available from: http://www.cfbroward.org/cfbroward/media/Documents/Sidebar%20Documents/GivingUSA_2010_ExecSummary_Print.pdf [accessed 12 January 2011].
7. *Donor retreat widens HIV/AIDS treatment gap in Africa*. Johannesburg: Medecins Sans Frontières; 2010. Available from: http://www.msf.org/msf/articles/2010/05/donor-retreat-widens-hivaids-treatment-gap-in-africa.cfm [accessed 12 January 2011].
8. Aid Activity Database of the Development Assistance Committee [Internet]. Paris: Organisation for Economic Co-operation and Development; 2008. Available from: http://www.oecd.org/dataoecd/20/29/31753872.htm [accessed 20 January 2011].
9. Camacho M, Perez-Quiros G, Saiz L. Are European business cycles close enough to be just one? *J Econ Dyn Control* 2006;30:1687–706. doi:10.1016/j.jedc.2005.08.012
10. Ruhm C. Are recessions good for your health? *Q J Econ* 2000;115:617–50. doi:10.1162/003355300554872
11. Wooldridge J. *Econometric analysis of cross-sectional and panel data.* Cambridge: MIT Press; 2002.
12. European Health for All Database (HFA-DB) [Internet]. Geneva: World Health Organization; 2008. Available from: http://www.euro.who.int/en/what-we-do/data-and-evidence/databases/european-health-for-all-database-hfa-db2 [accessed 20 January 2011].
13. Stuckler D, Basu S. *Six concerns about data used in the (dead) aid debate* Global Economic Governance Policy Brief. Oxford: Oxford University; 2010. Available from: http://www.globaleconomicgovernance.org/wp-content/uploads/Stuckler-and-Basu-Six-concerns-about-data-in-the-dead-aid-debate.pdf [accessed 24 January 2011].
14. Miller M, Kroll L. *World's billionaire – 2010 Forbes list.* Available from: http://www.yesbillionaire.com/2010/03/worlds-billionaire-2010-forbes-list.html [accessed 12 January 2011].
15. EDGAR database [Internet]. Washington: U.S. Securities and Exchange Commission; 2010. Available from: http://www.sec.gov/edgar.shtml. [accessed 12 January 2011].
16. Lagorio J. Even Bill Gates feeling the economic pinch. *Reuters*. 2009 Feb 17. Available from: http://uk.reuters.com/article/idUKTRE51G36N20090217 [accessed 12 January 2011].