Fundraising for operational expenditures in international humanitarian aid

Maria Besiou
Laura Turrini
Joern Meissner

McCormick School of Engineering and Applied Science, Northwestern University, 11/05/2015

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Prof. Dr. Maria Besiou

- Mechanical Engineering, Aristotle University of Thessaloniki (AUTH), Greece
- Ph.D., AUTH, Greece
  - Specialization: Reverse Logistics in electrical and electronic equipment (e.g. Sony)
- Postdoctoral Research Fellow, INSEAD, France
  - Topics: Humanitarian Logistics, Reverse Logistics in different sectors, Risk management in commercial logistics
- Associate Professor of Humanitarian Logistics, KLU

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Content

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- Introduction in humanitarian logistics
- Fundraising for operational expenditures in international humanitarian aid
    - Context
    - Research questions
    - Methodology
    - Results
    - Conclusions

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Introduction in humanitarian logistics

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Humanitarian logistics: Definition

- "Humanitarian Logistics is defined as the process of planning, implementing and controlling the efficient, cost-effective flow and storage of goods and materials, as well as related information, from the point of origin to the point of consumption for the purpose of alleviating the suffering of vulnerable people."

Thomas (2003)
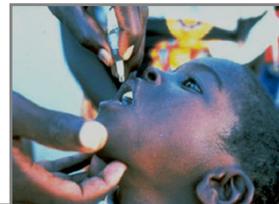
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Importance of humanitarian logistics

- Hundreds of millions are affected by disasters each year and the number is growing: the number of annual natural and man-made disasters has tripled since 1970
- 1974 – 2003: 6.637 natural disasters worldwide that affected more than 5 billion people and caused US$1.38 trillion in damage
- Approximately 80% of disaster relief efforts relate to logistics activities

Natural disasters reported 1900 – 2011
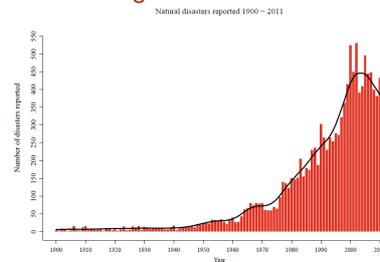
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Imagine organizing the Olympic Games but…

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- Not knowing where they will take place
- When they will take place
- How many athletes will take place
- How many volunteers will be
- How many sponsors will be
- How large the audience will be
- Not always under the best conditions…

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Fundraising for operational expenditures in international humanitarian aid:
The case of the International Federation of
Red Cross and Red Crescent Societies (IFRC)

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Context

- International humanitarian organizations (IHOs) need funding both at the headquarter and the field levels (operational needs: preparedness, procurement, transportation, inventory, warehousing and distribution)
    - Development and relief programs
- Humanitarian logistics: auxiliary function, not properly included in budgetary efforts
- Operational expenditures linked directly to beneficiaries, e.g. procurement, are easier to justify to the donors and are overstated, while others, like transportation, are more difficult to justify

Source: Van Wassenhove (2006): *Humanitarian aid logistics: Supply chain management in high gear.* The Journal of the Operational Research Society 57(5):475–489

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Funding cycle

Disaster strikes!
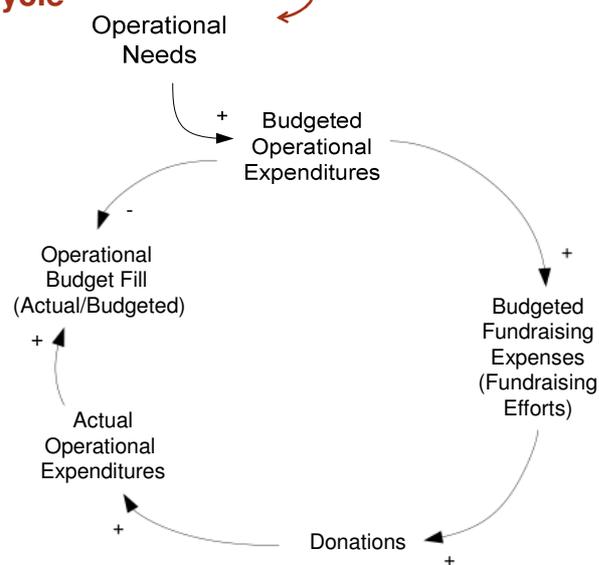
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Literature

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- Operational implications of fundraising deserve more research (Starr and Van Wassenhove 2014)
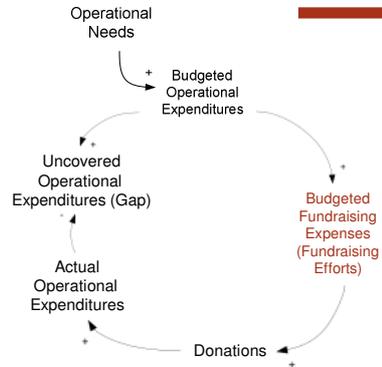
Operational Needs

Budgeted Operational Expenditures

Uncovered Operational Expenditures (Gap)

Actual Operational Expenditures

Budgeted Fundraising Expenses (Fundraising Efforts)

Donations

Source: Starr and Van Wassenhove (2014): *Introduction to the Special Issue on Humanitarian Operations and Crisis Management*. Production and Operations Management 23(6):925–937

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Literature

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- Demand for humanitarian help exceeds donations (Wakolbinger and Toyasaki 2011)
- Disaster response typically funded by both private and institutional donors
- Drivers of donations for institutional donors include fundraising expenditures, IHOs performance, location and disaster magnitude (Fink and Redaelli 2011, Bennett and Kottasz 2000, Hyndman and McDonnel 2009)

Operational Needs

Budgeted Operational Expenditures

Uncovered Operational Expenditures (Gap)

Actual Operational Expenditures

Budgeted Fundraising Expenses (Fundraising Efforts)

Donations
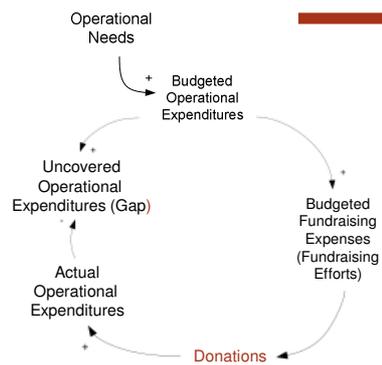
Sources: Wakolbinger and Toyasaki (2011) *Impacts of funding systems on humanitarian operations*. In: Christopher MG, Tatham PH (eds) Humanitarian Logistics: Meeting the Challenge of Preparing For and Responding To Disasters, Kogan Page, London, pp 33–46
Fink and Redaelli (2011): *Determinants of international emergency aid - Humanitarian need only?* World Development 39(5):741–757
Bennett and Kottasz (2000): *Emergency fund-raising for disaster relief*. Disaster Prevention and Management 9(5):352–359
Hyndman and McDonnel (2009): *Governance and charities: An exploration of key themes and the development of a research agenda*. Financial Accountability & Management 25(1):5–31

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Literature

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- International humanitarian organizations (IHO) in their budget appeals need to prioritize (Starr and Van Wassenhove 2014)
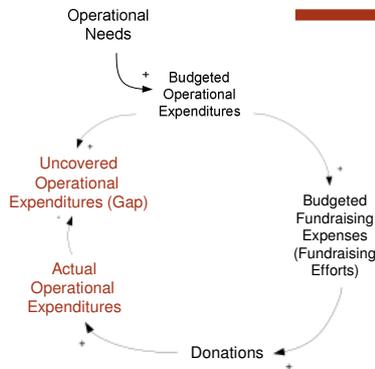
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IFRC data description

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62 Disaster response operations:

All final reports published in the period Jan 2010 – April 2014

243 Development programs:

All programs running in 2010-2012

Emergency appeal final report
Viet Nam: Mekong Delta Floods

www.ifrc.org
Saving lives, changing minds.

International Federation of Red Cross and Red Crescent Societies

Final Report
Emergency appeal n° MDRVN009
GLIDE n° FL-2011-000137-VNM
28 February 2013

Period covered by this final report:
9 November 2011 to 31 October 2012;

Appeal target (current):
CHF 1,107,186

Appeal coverage: 102 per cent;
<click here to go directly to the financial report, or here to view the contact details>

Appeal history:
- CHF 210,710 was initially allocated from the Federation's Disaster Relief Emergency Fund (DREF) on 18 October 2012 to support the Viet Nam Red Cross (VNRC) in its initial response to Mekong Delta Floods.
- 9 November 2011, this Emergency Appeal was initially launched for

- Budget appeal
- Donations raised (cash + in-kind)
  1% from private, 99% from public donors
- Country of operation
- Donations of previous year
- *Criticality*:
  - Target beneficiaries
  - Type of disaster
  - Disaster magnitude (only relief) (EM-DAT[1])

Disaster profile

1. *EM-DAT is an online database maintained by the Centre for Research on the Epidemiology of Disasters (CRED), containing core data on the occurrence and effects of disasters from 1900 to present.*

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IFRC data description (2)

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62 Disaster response operations:

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  Floods.
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Budgeted and actual:

- Fundraising expenditures

- Logistics costs
- Inventory costs
- Asset costs   Operational
                         expenditures
- Procurement costs
- Construction costs

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Additional sources variables description

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We integrate in our analysis some variables, that come from external
datasets:

- *Development status*:
  - Health of economy: GDP per capita (C.I.A.[1])
  - Infrastructure: Paved roads (km) (C.I.A.)   Country profile
  - Corruption Index (Transparency International[2])
- Accessibility: Landlocked (C.I.A.)
- Population (C.I.A.)

1. *C.I.A. World Factbook provides information about economy, people, government, communication, transportation, geography, history and transnational issues for almost each country worldwide. https://www.cia.gov/library/publications/the-world- factbook/*
2. *Transparency International has the mission to encourage transparency and fight corruption. It publishes yearly a "Corruption perceptions index", where, through expert surveys, it measures the perceived corruption degree of the public sector worldwide, see http://www.transparency.org*

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Data description – disaster types

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In case of relief, we further divide our dataset in the following categories:

Type of disaster	Disaster response operations
Rapid-onset	41
Slow-onset	23

- Rapid-onset: flood, storm, volcano, etc.
- Slow-onset: drought, etc.

Type of disaster	Disaster response operations
Complex	16
Non-complex	46

- Complex emergency: when more than one type of disaster occurs at the same time (e.g.: earthquake + tsunami)

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Research questions: what do we investigate?

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1. Which factors affect budgeted operational expenditures (logistics, inventory, procurement, asset and construction) in case of relief and development programs?

   - Country profile?
     - ➤ Preparedness can reduce impact (Kovács and Spens 2009)
     - ➤ Infrastructure status impacts costs (Balcik et al. 2008)
   - Criticality of program?
     - ➤ Number of affected people drives needs (Jahre and Navangul 2011)

Operational Needs
+ Budgeted Operational Expenditures
-
Operational Budget Fill (Actual/Budgeted)
+
Actual Operational Expenditures
+
Donations
+
+
Budgeted Fundraising Expenses (Fundraising Efforts)
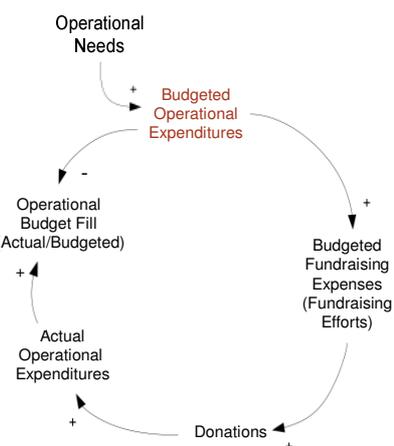
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Research questions: what do we investigate?

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2. Which factors affect budgeted fundraising expenses?

- Operational expenditures?
  - ➢ Beneficiary-oriented activities are easier funded (Van Wassenhove 2006)
- Criticality?
  - ➢ Unpopular emergencies need more fundraising (Wakolbinger and Toyasaki 2011)
- Country profile?

Operational Needs

+ Budgeted Operational Expenditures

- Operational Budget Fill (Actual/Budgeted)

+

Actual Operational Expenditures

+ Donations +

+ Budgeted Fundraising Expenses (Fundraising Efforts)
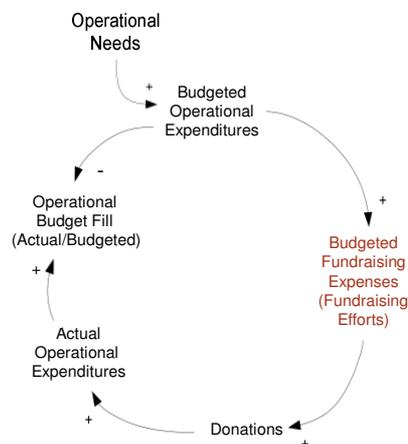
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Research questions: what do we investigate?

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3. Which are the drivers of donations for institutional donors?

- Operational expenditures?
- Fundraising?
  - ➢ (Waters 2009, Okten and Weisbrod 2000)
- Criticality?
  - ➢ Popularity and media attention (Wakolbinger and Toyasaki 2011, Walker and Pepper 2007, Balaisyte et al. 2011)
- Country profile?

Operational Needs

+ Budgeted Operational Expenditures

- Operational Budget Fill (Actual/Budgeted)

+

Actual Operational Expenditures

+ Donations +

+ Budgeted Fundraising Expenses (Fundraising Efforts)
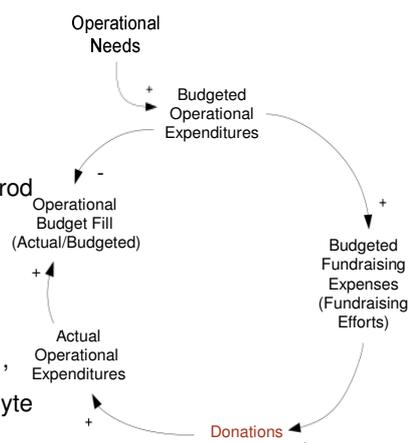
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Research questions: what do we investigate?

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4. Which factors drive operational budget fill (actual/budgeted)?

   • Fundraising?
   • Criticality?
   • Country profile?

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RQs

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Methodology

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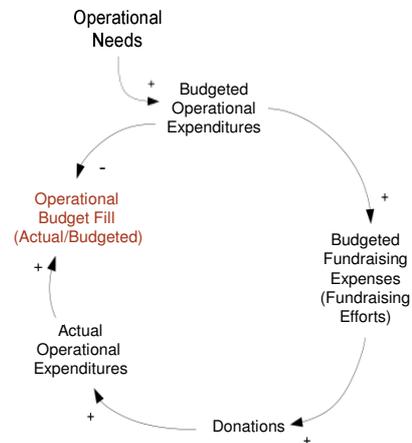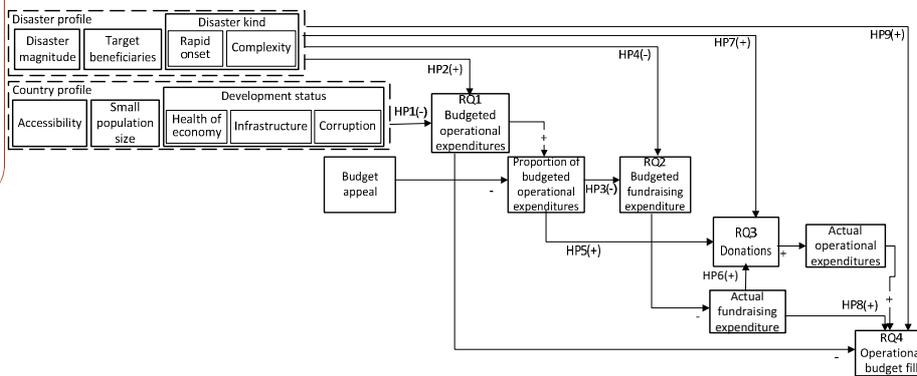
- Multiple regression analysis, with Ordinary Least Squares (OLS) and two-stages least square (2SLS)
- Log-Log model
- Use of robust standard errors when Heteroskedasticity[1] is identified
- Cook's Ds for Outliers analysis (max D ≤ 1 for classic OLS)[2]

Sources:
[1] Wooldridge (2009) *Introductory econometrics: A modern approach.* South Western Cengage Learning
[2] Cohen et al. (2003) *Applied multiple regression/correlation analysis for the behavioral sciences.* L. Erlbaum Associates

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Models – RQ2 (Relief)[4]

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$$\log FundraisingBDG = \beta_0 + \beta_1 \log BudgetAppeal + \beta_2 LogisticsBDGratio +$$
$$+ \beta_3 InventoryBDGratio + \beta_4 ProcurementBDGratio + \beta_5 AssetBDGratio +$$
$$+ \beta_6 ConstructionBDGratio + \beta_7 \log TargetBeneficiaries + \beta_8 \log DisasterMagnitude +$$
$$+ \beta_9 RapidEmergency + \beta_{10} ComplexEmergency + \beta_{11} \log GDPpercapita +$$
$$+ \beta_{12} \log PavedRoadsKm + \beta_{13} Landlocked + \beta_{14} \log Population +$$
$$+ \beta_{15} \log CorruptionIndex + \varepsilon$$

- *LogisticsBDGratio* – Budgeted logistics costs / Budget appeal
- …
- *RapidEmergency* – Dummy coded variable. Ref: slow-onset emergency
- *ComplexEmergency* – Dummy coded variable. Ref: non-complex emergency
- *Landlocked* – Dummy coded variable. Ref: non-landlocked

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4   MARIA: I thought to show better this model (it is the only one that I am showing in my presentation) as you have the change to explain what LogisticsBDGratio and the other ratios are.
Laura Turrini; 27.10.2015

Results

RQ1: Drivers of BDG expenditures (Relief)

Indep.Vars↓ Dep.Vars→	Logistics	Inventory	Procur.	Asset	Constr.
(intercept)	4.24 (0.17)	-4.48 (0.47)	3.12 (0.25)	-5.22 (0.23)	3.36 (0.72)
TargetBeneficiaries	0.52*** (0.0001)	0.74*** (4.0e-05)	0.44** (0.001)	0.53** (0.001)	0.36 (0.50)
DisasterMagnitude	0.09 (0.30)	0.11 (0.39)	0.18* (0.03)	0.15 (0.20)	-0.12 (0.67)
RapidEmergency	0.38 (0.25)	0.31 (0.61)	1.08** (0.001)	-0.68 (0.13)	0.41 (0.79)
ComplexEmergency	-0.39 (0.24)	-0.07 (0.90)	0.13 (0.57)	-0.32 (0.44)	0.003 (0.99)
GDPpercapita	-0.05 (0.80)	0.43 (0.24)	-0.04 (0.85)	0.72* (0.04)	0.64 (0.62)
PavedRoadsKm	0.11 (0.09)	0.16 (0.07)	0.03 (0.52)	-0.09 (0.14)	-0.25 (0.08)
Landlocked	0.07 (0.82)	1.04 (0.05)	0.17 (0.57)	-0.53 (0.17)	-1.68* (0.04)
Population	-0.01 (0.91)	0.02 (0.96)	0.13 (0.24)	0.18 (0.33)	0.32 (0.50)
CorruptionIndex	0.01 (0.99)	-0.33 (0.43)	0.21 (0.61)	0.03 (0.98)	-0.81 (0.61)
N	61	48	62	49	23
F	3.31	3.64	6.78	6.29	2.34
Prob > F	0.003	0.002	0.0000	0.0000	0.08
R^2(Adj)	0.41(.30)	0.45(.33)	0.49(.41)	0.53(.43)	0.27(-.23)

RQ1: Drivers of BDG expenditures (Relief)

Indep.Vars↓ Dep.Vars→	Logistics	Inventory	Procur.	Asset	Constr.
(intercept)	4.24 (0.17)	-4.48 (0.47)	3.12 (0.25)	-5.22 (0.23)	3.36 (0.72)
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GDPpercapita	-0.05 (0.80)	0.43 (0.24)	-0.04 (0.85)	0.72* (0.04)	0.64 (0.62)

Disaster profile
- Target beneficiaries ↑ BDG expenditures

  Higher needs
- Disaster magnitude ↑ BDG procurement expenditures

  Congestion/Saturation
- Rapid emergency ↑ BDG expenditures than slow emergency

  Stronger time constraint and saturation effect

R²(Adj) 0.41(.30) 0.45(.33) 0.49(.41) 0.53(.43) 0.27(-.23)

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RQ1: Drivers of BDG expenditures (Relief)

Indep.Vars↓ Dep.Vars→	Logistics	Inventory	Procur.	Asset	Constr.

- GDP ↑ BDG asset expenditures

  GDP ↓ probability of needing asset expenditures   *Less needs, higher costs*
- No other significant influence of country profile can be found

  Criticality? (They are significant for development!)
  Lack of data?

GDPpercapita	-0.05 (0.80)	0.43 (0.24)	-0.04 (0.85)	0.72* (0.04)	0.64 (0.62)
PavedRoadsKm	0.11 (0.09)	0.16 (0.07)	0.03 (0.52)	-0.09 (0.14)	-0.25 (0.08)
Landlocked	0.07 (0.82)	1.04 (0.05)	0.17 (0.57)	-0.53 (0.17)	-1.68* (0.04)
Population	-0.01 (0.91)	0.02 (0.96)	0.13 (0.24)	0.18 (0.33)	0.32 (0.50)
CorruptionIndex	0.01 (0.99)	-0.33 (0.43)	0.21 (0.61)	0.03 (0.98)	-0.81 (0.61)
N	61	48	62	49	23
F	3.31	3.64	6.78	6.29	2.34
Prob > F	0.003	0.002	0.0000	0.0000	0.08
R^2(Adj)	0.41(.30)	0.45(.33)	0.49(.41)	0.53(.43)	0.27(-.23)

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RQ1: Drivers of BDG expenditures (Development) [5]

Indep.Vars↓ Dep.Vars→	Logistics	Inventory	Procur.	Asset	Constr.
(intercept)	16.14*** (4.3e-18)	17.73*** (5.6e-05)	15.82*** (5.6e-13)	13.12*** (3.9e-08)	14.00*** (6.9e-05)
AppealFillPreviousYear	0.48* (0.02)	0.36 (0.47)	0.60** (0.009)	0.66* (0.01)	0.92* (0.01)
GDPpercapita	-0.54*** (5.9e-06)	-0.49* (0.02)	-0.37** (0.009)	-0.27 (0.13)	0.23 (0.42)
PavedRoadsKm	0.003 (0.91)	0.10 (0.33)	0.02 (0.53)	0.07 (0.18)	-0.02 (0.82)
Landlocked	0.23 (0.36)	-0.003 (0.99)	0.45 (0.09)	0.13 (0.65)	0.08 (0.86)
Population	0.10 (0.21)	-0.15 (0.43)	0.14 (0.09)	0.09 (0.31)	0.04 (0.79)
CorruptionIndex	-1.02*** (0.0009)	-1.10* (0.02)	-1.26*** (0.0005)	-1.09** (0.007)	2.11*** (7.9e-05)
N	186	92	174	132	70
F	12.72	2.47	9.73	7.15	6.61
Prob>F	0.0000	0.03	0.0000	0.0000	0.0000
R^2 (Adj)	0.27(.25)	0.13(.07)	0.26(.23)	0.22(.19)	0.29(.22)

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RQ1: Drivers of BDG expenditures (Development)

Country profile

- GDP per capita ↓ probability of needing BDG operational expenditures and: GDP per capita ↓ BDG operational expenditures.

  More stable market

- Perceived corruption ↓ probability of having BDG expenditures and: Perceived corruption ↓ BDG operational expenditures.

  Donors' reluctance?

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5   Logistic regression is at the end if you need it
Laura Turrini; 27.10.2015

RQ1: Drivers of BDG expenditures (Development) [6]

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AppealFillPreviousYear	0.48* (0.02)	0.36 (0.47)	0.60** (0.009)	0.66* (0.01)	0.92* (0.01)
GDPpercapita	-0.54*** (5.9e-06)	-0.49* (0.02)	-0.37** (0.009)	-0.27 (0.13)	0.23 (0.42)
PavedRoadsKm	0.003 (0.91)	0.10 (0.33)	0.02 (0.53)	0.07 (0.18)	-0.02 (0.82)
Landlocked	0.23	0.002	0.45	0.12	0.08

- Appeal fill previous year ↑ (probability of needing) BDG procurement expenditures.

Confidence?

Prob>F	0.0000	0.03	0.0000	0.0000	0.0000
R^2 (Adj)	0.27(.25)	0.13(.07)	0.26(.23)	0.22(.19)	0.29(.22)

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RQ2: Drivers of BDG fundraising

Variables	Coefficients
(intercept)	1.50 (0.79)
BudgetAppeal	1.40** (0.004)
LogisticsBDGratio	-6.42 (0.11)
InventoryBDGratio	3.64 (0.82)
ProcurementBDGratio	-8.31** (0.009)
AssetBDGratio	3.01 (0.75)
ConstructionBDGratio	2.02* (0.02)
DisasterMagnitude	-0.005 (0.97)
TargetBeneficiaries	-0.44 (0.14)
RapidEmergency	0.99 (0.11)

Variables	Coefficients
(intercept)	6.29** (0.006)
BudgetAppeal	0.13*** (6.1e-06)
LogisticsBDGratio	7.67* (0.04)
InventoryBDGratio	10.67 (0.12)
ProcurementBDGratio	-0.13 (0.90)
AssetBDGratio	-1.85 (0.79)
ConstructionBDGratio	-0.44 (0.89)

- (Relief) Proportion of procurement costs ↓ BDG fundraising expenditures.
- (Relief) Proportion of construction costs ↑ BDG fundraising expenditures.
- (Development) Proportion of logistics costs ↑ BDG fundraising expenditures.

Visibility / donors' preferences

- (Relief) No other effect is found.

No tailoring?

Prob > F	0.0000		Prob>F	0.0000
R^2(Adj)	0.62(.49)		R^2(Adj)	0.32(.28)

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6   Logistic regression is at the end if you need it

          Laura Turrini; 27.10.2015

RQ3: Drivers of donations

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Variables	Coefficients
(intercept)	2.46 (0.34)
FundraisingACT	0.33*** (0.0002)
LogisticsBDGratio	1.83 (0.65)
InventoryBDGratio	5.97 (0.55)
ProcurementBDGratio	3.87*** (2.4e-05)
AssetBDGratio	4.56 (0.30)
ConstructionBDGratio	-0.38 (0.70)
TargetBeneficiaries	0.49*** (1.9e-08)
DisasterMagnitude	0.10 (0.09)
RapidEmergency	0.20 (0.49)
ComplexEmergency	0.07 (0.77)
GDPpercapita	-0.17 (0.32)
PavedRoadsKm	0.13* (0.01)
Landlocked	-0.15 (0.48)
Population	-0.02 (0.85)
CorruptionIndex	-0.02 (0.96)
N	62
Wald chi^2	180.36
Prob>chi^2	0.0000
R^2	0.59

Variables	Coefficients
(intercept)	6.28 (0.05)
FundraisingACT	0.63** (0.001)
LogisticsBDGratio	-6.36 (0.36)
InventoryBDGratio	-12.97 (0.38)
ProcurementBDGratio	1.16 (0.64)
AssetBDGratio	-2.46 (0.56)
ConstructionBDGratio	5.60 (0.21)
DonationsPreviousYear	0.07 (0.61)
GDPpercapita	-2.66 (0.14)
PavedRoadsKm	-0.13 (0.08)
Landlocked	-0.24 (0.57)
Population	0.31** (0.005)
CorruptionIndex	-0.66 (0.25)
N	215
Wald chi^2	107.88
Prob>chi^2	0.0000
R^2	0.40

- Fundraising ↑ Donations
  Awareness
- Procurement ratio ↑ Donations (relief)
  Visibility / Beneficiaries-oriented
- Target beneficiaries ↑ Donations (relief)

More output?

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RQ3: Drivers of donations (Relief) - Comparisons

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Rapid vs. slow-onset emergencies:

- Fundraising's impact ↓ Rapid emergencies.

Media?

- Disaster magnitude ↑ Donations for slow-onset emergencies.

Stronger time constraint ➜ Decisions depend on less factors

Complex vs. non-complex emergencies:

- Disaster magnitude ↑ Donations for complex emergencies.

Complex emergencies ➜ Decisions depend on more factors

No differences in fundraising policies!

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RQ4: Drivers of operational budget fill (Relief)

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Indep.Vars↓ Dep.Vars→	Logistics	Inventory	Procur.	Asset	Constr.
(intercept)	-4.04 (0.15)	-11.77 (0.07)	-5.63 (0.16)	-20.47* (0.03)	-2.25 (0.83)
$CostBDG_i$	-0.31* (0.02)	-0.50*** (4.9e-06)	-0.14 (0.59)	-0.66*** (1.36e-05)	-0.46*** (5.2e-05)
FundraisingACT	0.47* (0.01)	0.66*** (0.0002)	0.47 (0.13)	0.61** (0.002)	0.26 (0.13)
AppealFill	2.07** (0.003)	3.47* (0.04)	2.61 (0.06)	4.48* (0.01)	-0.05 (0.98)
TargetBeneficiaries	-0.26* (0.04)	0.47 (0.21)	-0.51* (0.03)	0.70* (0.03)	-0.01 (0.98)
DisasterMagnitude	-0.04 (0.68)	-0.29 (0.09)	-0.11 (0.40)	-0.18 (0.51)	-0.001 (0.99)
RapidEmergency	-0.42 (0.36)	1.28 (0.33)	-0.45 (0.55)	0.34 (0.71)	2.56 (0.10)
ComplexEmergency	-0.56 (0.23)	-0.17 (0.82)	-0.82 (0.18)	-0.31 (0.78)	0.84 (0.46)
GDPpercapita	0.19 (0.46)	0.81 (0.24)	0.44 (0.21)	0.08 (0.91)	-0.47 (0.55)
PavedRoadsKm	-0.05 (0.40)	-0.02 (0.92)	-0.05 (0.57)	-0.16 (0.39)	-0.51 (0.11)
Landlocked	0.04 (0.88)	-0.27 (0.81)	-0.02 (0.96)	0.03 (0.98)	-2.47 (0.22)
Population	0.20 (0.18)	0.11 (0.78)	0.23 (0.24)	0.14 (0.76)	0.18 (0.76)
CorruptionIndex	0.17 (0.66)	-1.20 (0.27)	0.22 (0.67)	2.69 (0.08)	1.70 (0.27)
N	62	62	62	62	62
F	2.76	7.11	3.37	5.96	2.38
Prob>F	0.006	0.0000	0.001	0.0000	0.016
R^2(Adj)	0.69(.61)	0.62(.53)	0.45(.32)	0.56(.46)	0.42(.28)

- Fundraising expenditures ↑ Fill of Logistics, Inventory and Asset expenditures
  - IFRC feels "compelled"
- Appeal fill ↑ Fill of Logistics, Inventory and Asset expenditures
  - Low priority
- Other effects
  - Over/under estimations
- Similar results in the case of development

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Conclusions

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- Criticality of the program plays an important role! Very little effect of country conditions (GDP, etc.) on budget for relief programs

- Fundraising effort increases for budgeted expenses with low visibility [logistics (development) and construction (relief)] and decreases for expenses with high visibility [procurement (relief)], but is not tailored on other kind of donors' preferences

- Donors awareness increases the budgeted cost fill for operational costs

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Future research

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- Organizations depending on private donors

- Decision optimization model

- Impact of donor proximity

- Integration of political aspects

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Thank you!

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