Fungibility and the Choice of Aid Modalities

The Red Herring Revisited

Stefan Leiderer
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Main Concerns in the Policy Debate on Aid Modalities

**Strong empirical arguments for programme-based aid over project aid**

- Transaction costs: administrative cost and inefficiencies due to fragmentation and misalignment
- Ownership and sustainability

**But: fiduciary risk of PBAs**

- Risk that aid resources are not (or not efficiently) used for the purposes intended by the donor
- Main reason: fungibility (aid money does not stick)
The Choice of Aid Modalities

Does it really make a difference?

✓ Does fiduciary risk due to fungibility really differ fundamentally between aid modalities?
✓ If it does, what can donors do to about it?
A Basic Model of Aid Modalities
A Basic Fungibility Model

Known 'technology' for poverty reduction

Two categories of public expenditure:
- pro-poor expenditure $ppe$
- other non-poverty-reducing expenditure $x_0$

Recipient government maximizes utility (or political support) function:

$$W^G = ppe^\Theta x_0^{1-\Theta} \quad s.t. \quad ppe + x_0 \leq Y + T \quad 0 < \Theta < 1$$

Altruistic donor:

$$W^D = ppe \quad T \leq A$$

One period, different aid modalities
Aid Modalities

**Project Aid**
- Donor spends aid directly on pro-poor expenditure: \( T = ppe^D \)

**General Budget Support**
- Non-earmarked aid transfer: \( T = A \)

**Aid on Delivery / Results-based Aid**
- Amount transferred conditional on government's own effort (expenditure): \( T = \varepsilon \cdot ppe^a \)
Basic Case: Full Information
Autarky

\[ x_0^a = (1 - \Theta)Y \]

\[ ppe^a = \Theta Y \]
General Budget Support

\[ x_0^* = (1 - \Theta)(Y + A) \]

\[ ppe^* = \Theta(Y + A) \]
$x_0^* = (1 - \Theta)(Y + A)$
Partially Fungible Project Aid
Partially Fungible Project Aid

The diagram illustrates the concept of partially fungible project aid. The axes are labeled $x_0$ and $Y + A_{ppe}$, with points $O$, $Y$, $A$, and $E$. The line $t_o$ and the point $E$ are also indicated on the graph.
Aid on Delivery

![Graph showing aid on delivery](image)
Aid on Delivery
Aid on Delivery without Fungibility

\[ \varepsilon = \frac{A}{\Theta Y} \]
Aid on Delivery with Fungibility

\[ \epsilon = \frac{A}{\Theta Y} \]
Aid on Delivery with Fungibility

\[ x_0 = (1 - \Theta)(Y + A) \]

\[ ppe^* = \Theta(Y + A) \]

\[ \varepsilon \in \frac{A}{\Theta Y A} \]
Fungible Aid on Delivery with Fully Informed Donor

\[ \frac{A}{Y} \leq 1 - \Theta \]

\[ \varepsilon = \frac{A}{\Theta Y + A} \]

\[ x_0^* = (1 - \Theta)Y \]

\[ ppe^* = \Theta Y + A \]
Fungible Aid on Delivery with Fully Informed Donor

\[ 1 - \Theta < \frac{A}{Y} < \frac{1 - \Theta}{\Theta} \]

\[ \frac{A}{Y} < 1 \]

\[ x_0 = A \]

\[ \mathcal{F} \]

\[ \mathcal{H} \]

\[ ppe^* = Y \]

\[ \varepsilon = \frac{A}{Y} \]
\[
\frac{1 - \Theta}{\Theta} < \frac{A}{Y} < 1 \quad \left( \text{or} \quad \Theta > \frac{Y}{Y + A} \right)
\]
Fungible Aid on Delivery with Fully Informed Donor

\[ \frac{A}{Y} > 1 \]

\[ \Theta \geq \frac{Y}{Y + A} \]

\[ \varepsilon = \frac{A}{Y} \]
Fungible Aid on Delivery with Fully Informed Donor

\[
\frac{A}{Y} > 1 \quad \Theta < \frac{Y}{Y + A}
\]

\[
x_0^* = A
\]

\[
\epsilon = \frac{A}{Y}
\]

\[
pp^e = Y
\]

\[
pp^e = Y
\]
Fungible Aid on Delivery with Fully Informed Donor

\[ A' = (1 - \Theta)Y \]

\[ \Theta < \frac{Y}{Y + A} \]

\[ x_0^* = (1 - \Theta)Y \]

\[ \epsilon = 1 - \Theta \]

\[ ppe^* = Y \]
### Aid Effectiveness with full information

<table>
<thead>
<tr>
<th>Aid Modality</th>
<th>Aid Dependency (Donor Utility)</th>
<th>Government Utility</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GBS</strong></td>
<td>$\Theta(Y + A)$</td>
<td>$[\Theta(Y + A)]^\Theta \cdot [(1 - \Theta)(Y + A)]^{1-\Theta}$</td>
</tr>
<tr>
<td><strong>Project Aid</strong></td>
<td>$\frac{A}{Y} &gt; \frac{\Theta}{1-\Theta}$</td>
<td>$A$</td>
</tr>
<tr>
<td></td>
<td>$\frac{A}{Y} \leq \frac{\Theta}{1-\Theta}$</td>
<td>$\Theta(Y + A)$</td>
</tr>
<tr>
<td><strong>AoD</strong></td>
<td>$\frac{A}{Y} \leq 1 - \Theta$</td>
<td>$\Theta Y + A$</td>
</tr>
<tr>
<td></td>
<td>$\frac{1-\Theta}{\Theta} &gt; \frac{A}{Y} &gt; 1 - \Theta$</td>
<td>$Y^*$</td>
</tr>
<tr>
<td></td>
<td>$\frac{A}{Y} \geq \frac{1-\Theta}{\Theta}$</td>
<td>$\Theta(Y + A)$</td>
</tr>
</tbody>
</table>

* Assuming the donor only disburses the amount necessary to achieve $ppe = Y$, but ignoring any possible positive or negative utility derived from undischursed aid funds.

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Relative Effectiveness of Aid Modalities

$$\frac{A}{Y} = \frac{\Theta}{1 - \Theta}$$

$$\frac{A}{Y} = \frac{1 - \Theta}{\Theta}$$

Project

GBS

AoD
Preferred Aid Modalities

Donor

\[
\frac{A}{Y}
\]

\[
\theta
\]

Project > GBS ≈ AoD

Project > AoD > GBS

AoD > Project > GBS

AoD > GBS ≈ Project

Government

\[
\frac{A}{Y}
\]

\[
\theta
\]

GBS ≈ AoD > Project

GBS > Project > AoD

GBS > Project > AoD

GBS ≈ Project > AoD

GBS ≈ AoD ≈ Project

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Donor knows A, Y and functional form of $W^G$

$\theta$ is private information of the government

Donor bases her decision on aid modality on government‘s ‘signal‘ (cheap talk)
Case A: Project versus GBS

Donor gives GBS for

\[ \tilde{\Theta} \geq \frac{A}{Y + A} \]

Donor gives project aid for

\[ \tilde{\Theta} < \frac{A}{Y + A} \]
Case A: Project versus GBS

\[ \Theta \geq \frac{A}{Y + A} \]

\[ \tilde{\Theta} = \Theta \]
Case A: Project versus GBS

\[
\Theta < \frac{A}{Y + A}
\]

\[
\bar{\Theta} \geq \frac{A}{Y + A}
\]
Case B: Project versus AoD

Donor gives AoD for

Donor gives project aid for

Donor is indifferent for

\[ 1 > \frac{A}{Y} < \frac{1 - \tilde{\Theta}}{\tilde{\Theta}} \]

\[ 1 < \frac{A}{Y} > \frac{\tilde{\Theta}}{1 - \tilde{\Theta}} \]

\[ \frac{\tilde{\Theta}}{1 - \tilde{\Theta}} > \frac{A}{Y} > \frac{1 - \tilde{\Theta}}{\tilde{\Theta}} \]
### Aid Effectiveness with asymmetric information

<table>
<thead>
<tr>
<th>Modality Choice</th>
<th>$\frac{A}{Y}$</th>
<th>$\Theta$</th>
<th>$\tilde{\Theta}$</th>
<th>$\frac{A}{Y+A}$</th>
<th>$\frac{A}{Y+A}$</th>
<th>$\Theta(Y+A)$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project / GBS</td>
<td>$\forall$</td>
<td>$\Theta &lt; \frac{A}{Y+A}$</td>
<td>$\frac{A}{Y+A}$</td>
<td>$&gt;$</td>
<td></td>
<td>$\Theta(Y+A)$</td>
</tr>
<tr>
<td></td>
<td>$\Theta \geq \frac{A}{Y+A}$</td>
<td>$\Theta$</td>
<td>$=$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>$\leq 1$</td>
<td>$\Theta &lt; \frac{Y}{Y+A}$</td>
<td>$\Theta - (1 - \Theta) \frac{A}{Y}$</td>
<td>$&lt;$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Project / AoD</td>
<td>$&gt; 1$</td>
<td>$\Theta \geq \frac{Y}{Y+A}$</td>
<td>$\Theta$</td>
<td>$=$</td>
<td>$\Theta(Y+A)$</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$\frac{Y}{Y+A} \leq \Theta &lt; \frac{A}{Y+A}$</td>
<td>$\frac{A}{Y+A}$</td>
<td>$&gt;$</td>
<td></td>
<td></td>
<td>$Y$</td>
</tr>
<tr>
<td></td>
<td>$\Theta &lt; \frac{Y}{Y+A}$</td>
<td>$\frac{A}{Y+A}$</td>
<td>$&gt;$</td>
<td></td>
<td></td>
<td>$Y$</td>
</tr>
</tbody>
</table>

$ppe^*$
Even with full information, GBS and project aid are equivalent over a wide range of aid dependency and commitment.

With full information: for low and moderate aid dependency, AoD is clearly more effective than project aid or GBS.

With asymmetric information, this advantage is eroded over a wide range of aid dependency / commitment combinations.
✓ Opposing incentives for government to over- or understate its commitment with GBS and AoD

✓ As long as multiple donors do not coordinate their different aid modalities, very limited scope to exploit this effect in order to reduce fiduciary risk

✓ With a coordinated modality mix, donors can induce “relatively uncommitted” governments to self-select into project aid

✓ For government commitment below some lower bound, government will access only part of the AoD tranche

✓ If recipient selectivity can exclude that government commitment is below this lower threshold, a coordinated GBS/AoD approach is always at least as effective as project aid
Conclusions

✓ Fungibility is indeed mostly a „red herring“ when it comes to aid modality choice
✓ Strong argument for programm-based aid, against project aid, even when abstracting from transaction costs
✓ With incomplete information about a recipient government‘s commitment to reduce poverty, a mix of budget support and RBA can reduce fiduciary risk
✓ But: donor coordination key to effectiveness of modality mix

Policy Message

✓ Donors should worry much less about which aid modality to choose over another and much more about their commitment to coordination and harmonization
Future Research
Proposal for future research

Necessary:

✓ Empirical research on effectiveness of PBAs and RBAs

But also:

✓ More formal research on political economy / incentives of aid and aid modalities on both sides of the aid relationship
✓ Make more use of what is already out there (for modelling and empirical testing)
Thank You!

Appendix
Autarky

\[ x_0^a = (1 - \Theta)Y \]

\[ ppe^a = \Theta Y \]
\[ x_0^* = (1 - \Theta)(Y + A) \]

\[ ppe^* = \Theta(Y + A) \]
\[ x_0^* = (1 - \Theta)(Y + A) \]
Non-Fungible Project Aid

[Diagram showing a graph with axes labeled as $x_0$ and ppe, with points A, Y, Y+A, and E, and a line labeled $t_\theta$.]
Base Case: Complete Information
Aid on Delivery without Fungibility

\[ \varepsilon = \frac{A}{\Theta Y} \]
Aid on Delivery with Fungibility

\[ \varepsilon = \frac{A}{\Theta Y} \]
Aid on Delivery with Fungibility

\[ x_0^* = (1 - \Theta)(Y + A) \]

\[ ppe^* = \Theta(Y + A) \]

\[ \varepsilon \approx \frac{A}{\Theta \Theta Y A} \]}
Fungible Aid on Delivery with Fully Informed Donor

\[ \frac{A}{Y} \leq 1 - \Theta \]

\[ x_0^* = (1 - \Theta)Y \]

\[ ppe^* = \Theta Y + A \]

\[ \varepsilon = \frac{A}{\Theta Y + A} \]
Fungible Aid on Delivery with Fully Informed Donor

\[ 1 - \Theta < \frac{A}{Y} < \frac{1 - \Theta}{\Theta} \quad \frac{A}{Y} < 1 \]

\[ x_0 = A \]

\[ \varepsilon = \frac{A}{Y} \]

\[ ppe^* = Y \]

\[ T^{ADD} \]
\[
\frac{1-\Theta}{\Theta} < \frac{A}{Y} < 1 \quad \left( \text{or } \Theta > \frac{Y}{Y+A} \right)
\]
Fungible Aid on Delivery with Fully Informed Donor

\[ \frac{A}{Y} > 1 \]
\[ \Theta \geq \frac{Y}{Y + A} \]

\[ \varepsilon = \frac{A}{Y} \]
Fungible Aid on Delivery with Fully Informed Donor

\[
\frac{A}{Y} > 1 \\
\Theta < \frac{Y}{Y + A}
\]

\[
x_0^* = A
\]

\[
\epsilon = \frac{A}{Y}
\]

\[
\text{pppe}^* = Y
\]
Fungible Aid on Delivery with Fully Informed Donor

\[ A' = (1 - \Theta)Y \]

\[ \Theta < \frac{Y}{Y + A} \]

\[ x_0 = (1 - \Theta)Y \]

\[ \epsilon = 1 - \Theta \]

\[ ppe^* = Y \]
Case A: Project versus GBS

\[ \Theta \geq \frac{A}{Y + A} \]

\[ \tilde{\Theta} = \Theta \]
Case A: Project versus GBS

\[ \Theta < \frac{A}{Y + A} \]

\[ \tilde{\Theta} \geq \frac{A}{Y + A} \]
Case B: Project versus AoD

- Donor gives AoD for
  \[ 1 > \frac{A}{Y} < \frac{1 - \Theta}{\Theta} \]

- Donor gives project aid for
  \[ 1 < \frac{A}{Y} > \frac{\Theta}{1 - \Theta} \]

- Donor is indifferent for
  \[ \frac{\Theta}{1 - \Theta} > \frac{A}{Y} > \frac{1 - \Theta}{\Theta} \]
Case B: Project versus AoD

\[
\frac{A}{Y} < 1 \quad \Theta < \frac{Y}{Y + A}
\]
Case B: Project versus AoD

\[ \frac{A}{Y} < 1 \]

\[ \Theta < \frac{Y}{Y + A} \]

\[ \tilde{\Theta} = \Theta - (1 - \Theta) \frac{A}{Y} \]
Multi-Donor Aid
✓ Two donors $D_1$ and $D_2$
✓ Shares $\alpha$ and $1-\alpha$ of total aid budget $A$
✓ $D_1$ offers either GBS or project aid
✓ $D_2$ offers AoD and adjusts matching element $\epsilon$
✓ Same information asymmetry regarding $\Theta$
✓ Each donor only considers her own aid in her decision
✓ Government knows total aid budget $A$
Uncoordinated Aid

\[ D_1 \text{ providing GBS} \]

\[ D_1 \text{ providing project aid} \]

\[ X_0 \quad Y \quad Y+A \quad \text{ppe} \]

\[ (1-\alpha)A \quad \alpha A \]

\[ \text{combined effective budget constraint} \]

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Aid on Delivery

Understating $\Theta$

$\Theta < \frac{\alpha A}{Y + \alpha A}$

Overstating $\Theta$

$\tilde{\Theta} = \frac{\alpha A}{Y + \alpha A}$

$D_1 \quad \quad \quad D_2 \quad \quad \quad \text{combined effective budget constraint}$
Uncoordinated Aid

\[ \Theta > \frac{\alpha A}{Y + \alpha A} \]

\[ \Theta > \frac{Y}{Y + (1 - \alpha)A} \]

\[ \tilde{\Theta} = \Theta \]

\[ \Theta = \frac{\alpha A}{Y + \alpha A} \]

\[ \Theta = \frac{Y}{Y + (1 - \alpha)A} \]

\[ \tilde{\Theta} = \Theta \]

Combined effective budget constraint
Uncoordinated Aid

- Combined effective budget constraint

\[ Y + \alpha A \]

\[ Y+\alpha A \]

\[ Y \]

\[ Y \]

\[ x_0 \]

\[ t \]

\[ F \]

\[ P \]

\[ K \]

\[ Y + A \]

\[ ppe \]
## Aid Effectiveness with Uncoordinated Aid

### Table 1: Aid Effectiveness with Uncoordinated Aid

<table>
<thead>
<tr>
<th>Condition</th>
<th>( \frac{A}{Y} \leq 1 )</th>
<th>( \frac{A}{Y} &gt; 1 )</th>
</tr>
</thead>
</table>
| \( \Theta \leq \frac{Y}{Y+(1-\alpha)A} \) | \( \Theta < \frac{A}{Y+A} \left(1 - \frac{\alpha^2 A}{Y+\alpha^A}\right) \) | \( \Theta \geq \frac{Y}{Y+\alpha A} \\
| | \( \Theta \geq \frac{A}{Y+A} \left(1 - \frac{\alpha^2 A}{Y+\alpha^A}\right) \) | \( \Theta \leq \frac{\alpha A}{Y+\alpha A} \\
| | \( \Theta > \frac{\alpha A}{Y+\alpha A} \) | \( \Theta - (1 - \Theta - \alpha) \frac{A}{Y} \) |

| \( \frac{Y}{Y+\alpha A} < \frac{Y}{Y+\alpha A} \leq 1 \) | \( \Theta \geq \frac{Y}{Y+\alpha A} \) | \( \max(\frac{\alpha A}{Y+\alpha A}; \frac{Y}{Y+(1-\alpha)A})^* \) | \( \geq \) | \( \Theta(Y+A) \) |
| | \( \Theta < \frac{Y}{Y+\alpha A} \) | | | \( Y \) |

### Table 2: Additional Conditions

<table>
<thead>
<tr>
<th>Condition</th>
<th>( \frac{(1-\alpha)A}{Y} )</th>
<th>( \Theta )</th>
<th>( \tilde{\Theta} )</th>
<th>( \tilde{\Theta} \leq \Theta )</th>
<th>( \text{pp})</th>
</tr>
</thead>
<tbody>
<tr>
<td>( 1 \leq \frac{(1-\alpha)A}{Y} )</td>
<td>( \Theta \geq \frac{Y}{Y+A} )</td>
<td>( \tilde{\Theta} \leq \Theta )</td>
<td>\max(\frac{\alpha A}{Y+\alpha A}; \frac{(1-\alpha)A}{Y+(1-\alpha)A})^* )</td>
<td>( \geq )</td>
<td>( \Theta(Y+A) )</td>
</tr>
<tr>
<td>( \frac{Y}{Y+\alpha A} \leq \frac{(1-\alpha)A}{Y} \leq 1 )</td>
<td>( \Theta \geq \frac{Y}{Y+\alpha A} )</td>
<td>( \tilde{\Theta} \leq \Theta )</td>
<td>\max(\frac{\alpha A}{Y+\alpha A}; \frac{Y}{Y+(1-\alpha)A})^* )</td>
<td>( \geq )</td>
<td>( \Theta(Y+A) )</td>
</tr>
<tr>
<td>( \frac{Y}{Y+\alpha A} \geq \frac{(1-\alpha)A}{Y} )</td>
<td>( \Theta \geq \frac{Y}{Y+\alpha A} )</td>
<td>( \tilde{\Theta} \leq \Theta )</td>
<td>\max(\frac{\alpha A}{Y+\alpha A}; \frac{Y}{Y+(1-\alpha)A})^* )</td>
<td>( \geq )</td>
<td>( \Theta(Y+A) )</td>
</tr>
</tbody>
</table>

*For \( \Theta > \max(\cdot; \cdot) \), the government can also set \( \tilde{\Theta} = \Theta \)

*\( \geq \) indicates a greater than or equal to relationship.
Coordinated Aid

☑ Two donors D₁ and D₂
☑ Shares α and 1-α of total aid budget A
☑ D₁ offers either GBS or project aid
☑ D₂ offers AoD and adjusts matching element ε
☑ Same information asymmetry regarding θ, but all other parameters known
☑ Donors coordinate shares α and 1-α allocated to GBS and AoD
☑ Donors can establish a threshold z for government signal below which they convert either the GBS tranche or the entire aid budget into project aid
Coordinated Aid without Threshold

\[ x_0 \]

\[ Y + \alpha A \]

\[ Y \]

\[ Y + A \]

\[ \alpha A \]

\[ (1-\alpha)A \]
Coordinated Aid: Indifference between project aid and partial disbursement of AoD

\[ t_\beta = \frac{z(Y + \alpha A) + (1-\alpha)A}{Y + A} \]