FAIR DISTRIBUTION OF MULTILATERAL TRADE GAINS

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Country	GDP ($Bn)	Description	
A	$15,000	Large Developed	These inputs are simply illustrative
B	$2,000	Medium Developed	
C	$1,000	Large Developing	
D	$400	Medium Developing	
Total	$18,400		

	GDP % Gain from Trade				
Coalition	A	B	C	D	
A,B	0.4%	3.0%	0.0%	0.0%	These inputs are reasonable but they are admittedly made up to demonstrate a fair trade concept.
A,C	0.3%	0.0%	4.0%	0.0%	
A,D	0.1%	0.0%	0.0%	10.0%	
B,C	0.0%	1.0%	2.0%	0.0%	
B,D	0.0%	0.6%	0.0%	4.0%	
C,D	0.0%	0.0%	1.0%	2.0%	
A,B,C	0.6%	4.0%	7.0%	0.0%	
A,B,D	0.5%	3.5%	0.0%	15.0%	
A,C,D	0.4%	0.0%	5.0%	13.0%	
B,C,D	0.0%	1.5%	2.5%	5.0%	
A,B,C,D	0.7%	5.0%	8.0%	20.0%	

	Incremental GDP ($ Billion)					
Coalition	A	B	C	D	Total	
A,B	$60	$60	$0	$0	$120	Gains achievable by various subcoaltions on their own
A,C	$45	$0	$40	$0	$85	
A,D	$15	$0	$0	$40	$55	
B,C	$0	$20	$20	$0	$40	
B,D	$0	$12	$0	$16	$28	
C,D	$0	$0	$10	$8	$18	
A,B,C	$90	$80	$70	$0	$240	
A,B,D	$75	$70	$0	$60	$205	
A,C,D	$60	$0	$50	$52	$162	
B,C,D	$0	$30	$25	$20	$75	
A,B,C,D	$105	$100	$80	$80	$365	Free Trade Distribution
% of Total	28.8%	27.4%	21.9%	21.9%	100%	
% GDP Gain	0.70%	5.00%	8.00%	20.00%	1.98%	
Shapley	$138	$97	$75	$56	$365	Fair Trade Distribution
% of Total	37.7%	26.5%	20.5%	15.4%	100%	
% GDP Gain	0.92%	4.83%	7.48%	14.02%	1.98%	

Notes

We are conceptualizing a multilateral trade agreement as a cooperative game where the players are nations negotiating on behalf of their citizens (workers). In this context, a fair distribution of GDP gains from trade doesn't just happen. It depends on what various subcoalitions of the nations could achieve on their own, i.e., what each nation contibutes incrementally to the overall gain from trade in a joint agreement. It involves side-payments among the nations to assure fairness, not just blind acceptance of whatever falls out. It also implicitly involves constant renegotiation over time to assure continuing fair distribution of overall gain, not just an agreement that is signed, forgotten, and never revisited. By comparison, joint ventures between firms are carefully negotiated, constantly monitored, and promptly terminated when they no longer provide equitable gains to one or more of the parties involved.

I employ Shapley Value as a fair distribution concept. Shapley Value for a player in a multi-player cooperative game is computed based on what that player contributes incrementally to the various player coalitions he might join. Shapley Value is axiomatically and mathematically derived, but it has found broad application as a fair distribution concept for both benefits and costs, even voting. Surprisingly, it has been largely absent from international trade discussions. I can only attribute this to hidebound attachment to the antiquated theory of comparative advantage, which is at best myopic in that it ignores the bargaining power of governments and at worst completely vacuous in that it takes no account of existing wage structures while capital and technology flow freely across borders. That leaves labor as the only "fixed endowment" beyond natural resources. Free trade, and particularly outsourcing, is wage arbitrage, pure and simple. And we are after all not talking about world welfare as a whole. We are talking about governments cutting the best deals for their citizens. In my view, the US government has been an abject failure in this regard. They have given away the store for decades on the basis of what amounts to free-trade "theology" without adequate compensation for their citizens. We now find ourselves with a denuded manufacturing sector, a shrunken middle class, political strife, and inadequate government revenues to fund assistance for dislocated workers.

In any event, google on Shapley Value for online references. A book reference is Guillermo Owen, Game Theory, Third Edition, Academic Press, Chapter XII. I have illustrated a four-nation trade game above. In a bilateral trade game, fair distribution is simply 50-50 as you might expect, i.e., you divide the total gain from trade equally between the two parties. Once again, the concept here is voluntary cooperation. No party is obligated to join any trade coalition, so there is no gain unless a coalition forms. There is no compulsion or enforcing power on the part of the international community. Nations only negotiate trade agreements when their citizens benefit appropriately.