

**FAIR AND EQUITABLE
MATRIX-BASED SHARING OF MONETARY BENEFITS
ARISING FROM THE UTILIZATION OF DIGITAL SEQUENCE INFORMATION**

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I. EXECUTIVE SUMMARY

As COP16 quickly approaches there is an intense effort to establish the parameters of a fair and equitable contribution scheme for the global fund authorized in COP Decision 15/9. The many challenges involved in designing such a scheme include (i) ensuring that the companies that contribute to the fund have a sufficient nexus to the utilization of digital sequence information, and (ii) not burdening smaller companies with costs that could adversely impact their competitiveness. This paper uses value chain analysis to identify seven specific categories of companies that benefit, i.e. earn profits, from the utilization of digital sequence information. The pertinence of digital sequence information to the profits of those companies are then classified as high, medium-high, medium, medium-low or low based on their position in the value chain. These five pertinence classifications are then paired with five company size classifications (based on profit and employment levels) to develop two 5x5 matrix-based contribution schemes for the global fund. The contribution rate applicable to a specific company would be determined based on its size and the pertinence of digital sequence information to its profits, and the applicable contribution rate would be applied only to that portion of a company's profits earned within a value chain that arises from the utilization of digital sequence information as determined based on audited data presented in the company's annual report. Finally, a proposal is also made to implement any matrix-based contribution scheme in two or three stages over the next few COP meetings.

II. VALUE CHAIN ANALYSIS

The Global Biodiversity Framework (“GBF”) adopted at COP 15 includes, among other things, agreements on the fair and equitable sharing of benefits from the utilization of genetic resources (“GR”) and digital sequence information on GR (“DSI”) and traditional knowledge associated with GR (“aTK”). These agreements are reflected in Goal C and Target 13 of the GBF and COP Decision 15/9 (collectively, the “DSI Policies” and, each individually, a “DSI Policy”). Each DSI Policy focuses on the utilization of GR and DSI that produce benefits. Target 13 and Decision 15/9, however, clarify the scope of the benefits that are in focus by seeking to ensure the fair and equitable sharing of benefits that arise from the utilization of GR and from DSI on GR, as well as aTK. According to the Merriam-Webster dictionary, the conventional definition of “arise” is “to begin to occur or to exist; to come into being”.¹ Therefore, the intention of the DSI Policies is to share the monetary benefits that begin to exist or come into being as a result of the utilization of GR, DSI and aTK (collectively, “Genetic Utilization”). The use of the phrase “benefits that arise from the utilization” in Target 13, and similar language in Decision 15/9, therefore, establishes an expansive policy objective to identify and share all of the monetary benefits that would not exist but for Genetic Utilization. The only limitation imposed on this broad policy objective is that the sharing must be fair and equitable to all parties.

When a company initiates Genetic Utilization, a series of commercial transactions related to that utilization occur causing monetary benefits from that utilization to arise – or come into existence

¹ Merriam-Webster.com (accessed August 31, 2024).

– along the entire value chain. “The value chain is not limited to a single company; it often involves multiple entities, including suppliers, manufacturers, distributors, and retailers. Collaboration and effective communication among these players are crucial for success.”² As explained by R. Kaplinsky and M. Morris,

The value chain describes the full range of activities which are required to bring a product or service from conception through the different phases of production (involving a combination of physical transformation and the input of various producer services), delivery to final consumers, and final disposal after use...**Production per se is only one of a number of value-added links.** Moreover, there are ranges of activities within each link of the chain...In addition to the manifold links in a value chain, typically **intermediary producers in a particular value chain may feed into a number of different value chains.**³

Consider, for example, Company A, a producer of specialty enzymes derived from Genetic Utilization. Company A purchases lab equipment from Company W and research materials from Company X, without which it could not produce its enzyme products. Company A sells its enzyme products to Company B, and Company B uses the enzyme products to manufacture soap with unique cleansing properties. Company B also enters into transactions with Company Y, a supplier of raw materials used in the production of soap, and Company Z, a supplier of generic soap manufacturing equipment that can be used to produce a wide range of soaps whether or not they are derived from Genetic Utilization. In addition, Company B purchases packaging for its soap from Company C and engages an advertising firm, Company D, to market the soap and its unique cleansing properties. After the soap is packaged, Company B engages Company E, a transport company and, Company F, a wholesaler, and the soap is transported to a warehouse operated by Company G, a logistics management company. Company F then enters into retail distribution agreements with Companies H, I and J and engages Company K, a second transport company, to transport the soap from the warehouse to Companies H, I and J. In this example, Companies A, B, C, D, E, F, G, H, I, J and K are companies that are in the primary product value chain, and Companies W, X, Y and Z are companies in secondary value chains related to the production of the soap. Importantly, every company in this example – other than Company Z – generated benefits, i.e. profits, from Genetic Utilization that would not exist but for that utilization. In other words, they have derived benefits that, in the words of Target 13 and Decision 15/9, arise from the utilization of GR, DSI and/or aTK. Only Company Z is excluded from this group of companies because Company B purchased the soap manufacturing equipment without a specific connection to manufacturing soap with unique, enzyme-based cleansing properties. It is worth noting, however, that if the soap in this example could only be manufactured using specialty manufacturing equipment, and Company B purchased such equipment from Company Z, then even Company Z would have derived benefits that arise from Genetic Utilization.

² Components of Commercial Value Chain, Genex Logistics, Medium (<https://medium.com/@GenexLogistics/components-of-commercial-value-chain-9af7b645d065>) (accessed September 2, 2024).

³ Kaplinsky, R. and M. Morris (2001), A Handbook for Value Chain Research, prepared for the International Development Research Centre (IDRC), p. 4–6 (emphasis added) (Accessed September 2, 2024)

Diagram 1. This chart provides an overview of the primary and secondary value chains for soap production as described above from conception to final delivery to the end consumer.

PRIMARY VALUE CHAIN		SECONDARY VALUE CHAIN	
<i>Company</i>	<i>Product/Service</i>	<i>Company</i>	<i>Product/Service</i>
A	Enzymes	W	Lab Equipment Supplier
		X	Research Materials Supplier
B	Soap	Y	Raw Materials Supplier
		Z	Manufacturing Equipment Supplier
C	Packaging		
D	Advertising		
E	Transportation		
F	Wholesale		
G	Logistics/Warehouse		
H	Retail Distribution		
I	Retail Distribution		
J	Retail Distribution		
K	Transportation		

The question then arises, when it comes to sharing all of these monetary benefits, what is fair and equitable to all of the parties. An outcome that relies exclusively on the direct users of GR, DSI and/or aTK while exempting companies that indirectly earn profits as a result of the Genetic Utilization decisions made by those direct users seems inherently unfair – both to the direct users, since they may then be expected to shoulder a heavier benefit sharing burden, and to the countries and IPLCs urgently in need of the maximum available funding to preserve and protect our planet’s biodiversity. However, an outcome that seeks contributions from companies with only a tenuous nexus to products derived from Genetic Utilization seems like an overreach, and therefore unfair. Fortunately, value chain analysis provides a common sense, straightforward answer as to how to structure a fair and equitable contribution scheme. Importantly, the contribution schemes proposed in this paper are based on an assessment of those **companies that directly and indirectly earn profits, i.e. have benefits arise, as a result of decisions to utilize GR, DSI and/or aTK**, and not whether a particular company operates in an industry that is highly-dependent upon GR, DSI and/or aTK which appears to be the current focus of the negotiations.⁴

⁴ This paper seeks to return to the original language used in the DSI Policies, all of which focus on **benefits that arise from the utilization** of GR, DSI and/or aTK. The focus on companies that are “highly dependent on the use of DSI” that has emerged during the intersessional negotiations constrains, and is arguably inconsistent with, the original language in the DSI Policies. In the Annex to the “Report of the Ad Hoc Open-ended Working Group on Benefit-sharing from the Use of Digital Sequence Information on Genetic Resources on its first meeting”, Paragraph 12 demonstrated an interest to broadly understand “[t]he scale and sectors of the industries that use digital sequence information on genetic resources, including information on, for example, turnover, profit, people employed, countries of operation and reliance on digital sequence information on genetic resources.” However, in the “Reflections of the Co-Chairs on the possible elements identified by the Working Group on Benefit-sharing from the Use of Digital Sequence Information on Genetic Resources at its first meeting”, the Co-Chairs suggested further consideration of a trigger based on “[a]n obligation to share benefits from the use of DSI... **when a business operates in a sector the turnover of which is substantially reliant on the use of DSI.**” While the focus on turnover parallels the

III. GLOBAL FUND CONTRIBUTOR CATEGORIES

As demonstrated in the example above, value chain analysis reveals that companies earn profits, and benefits therefore arise, directly and indirectly from Genetic Utilization. A fair and equitable approach would seek contributions to the global fund from all of these companies at relative rates that give due consideration to the pertinence of GR, DSI and/or aTK to their profits. Their important role in the value chain of DSI-based products and services establish a sufficiently close nexus to the utilization of GR, DSI and/or aTK to be considered beneficiaries of Genetic Utilization, and it is therefore reasonable to expect them to make contributions into the global fund.

Diagram 2. This chart generically categorizes and describes companies in a DSI value chain based on the pertinence of GR, DSI and/or aTK to their profits.

Pertinence of GR, DSI and aTK to Company Profits	Category	Description
High	Direct Producer (DP)	Providers of products or services that directly utilize GR, DSI and/or aTK (e.g., an enzyme manufacturer or pharmaceutical company)
Medium-High	Direct Supplier to a Direct Producer (DSDP)	A direct supplier of Required Goods or Services (as defined below) to a DP (e.g., a provider of specialized lab equipment to an enzyme manufacturer or pharmaceutical company)
	Indirect Producer (IP)	Providers of products or services that do not directly utilize GR, DSI and/or aTK, but utilize a product or service of a DP as an essential component of its products or services (e.g., a provider of climate-resilient and pest-resistant seeds or biofuels or bioplastics manufacturer)
Medium	Direct Supplier to an Indirect Producer (DSIP)	A direct supplier of Required Goods or Services (as defined below) to an IP (e.g., a provider of raw materials used in the seed, biofuel or bioplastics production process)

benefits language in the DSI Policies, the introduction of a “substantial reliance” standard curtails the broad language in the DSI Policies. Then Paragraph 9(b) of the “Synthesis of information for the further development of the multilateral mechanism established under decision 15/9, including elements of a draft recommendation” recast the Co-Chairs’ language by stating that the particular trigger would occur “when revenue is generated by companies operating in a sector that is highly dependent on the use of DSI.” This shift in operative language, which now suggests that private sector contributors should operate in sectors that are directly linked to the use of DSI, threatens to undermine efforts to effectively scale the global fund by imposing restrictions on the more expansive language included in the DSI Policies.

	Direct Consumer of a DP or IP (DCDPIP)	A company that provides a product or service by consuming a DP or IP product or service in its production process (e.g., farms that grow crops using climate-resilient or pest-resistant seeds or DSI-based pesticides or a mining company that uses enzymes to manage its tailing waste)
Medium-Low	Direct Consumer of a DCDPIP	A company that provides a product or service by consuming a DCDPIP product or service in its production process (e.g., a food company that uses DSI-based crops to produce cereal)
Low	Wholesaler, Retailer, Transporter, Logistics Provider or Marketer/Advertiser for any Producer or Consumer listed above	Any company that provides distribution, logistics or advertising services for any products or services generated from the utilization of GR, DSI or aTK

"Required Goods or Services" means those inputs, i.e. goods/services, used by a company without which it could not generate profits from the utilization of GR, DSI and/or aTK other than multi-purpose equipment that is useful to the company even in the absence of such utilization. As so defined, Required Goods and Services would include hardware, software, lab equipment, and all other inputs that are purchased specifically to generate profits from the utilization of GR, DSI and/or aTK, but would exclude supplies that do not have a direct connection to those company profits, e.g. cafeteria supplies, restroom supplies, general maintenance supplies, multi-purpose equipment, etc.

Diagram 3. This chart applies the five DSI pertinence levels described in Diagram 2 to the primary and secondary value chains for soap production as described above and shown in Diagram 1. This example does not include any medium-low companies in the value chain.

PRIMARY VALUE CHAIN		SECONDARY VALUE CHAIN	
<i>Company</i>	<i>Product/Service</i>	<i>Company</i>	<i>Product/Service</i>
A	Enzymes	W	Lab Equipment Supplier
		X	Research Materials Supplier
B	Soap	Y	Raw Materials Supplier
		Z	Manufacturing Equipment Supplier
C	Packaging		
D	Advertising		
E	Transportation		
F	Wholesale		
G	Logistics/Warehouse		
H	Retail Distribution		
I	Retail Distribution		
J	Retail Distribution		
K	Transportation		

IV. CONTRIBUTION RATE MATRIX WITH A TOP RATE OF 1.00%

While it is reasonable for companies that fall within the seven categories included in the chart above to contribute to the global fund, it would not be fair or equitable for all such companies to contribute to the global fund at the same rate given the variable pertinence of GR, DSI and aTK to their profits. The “Synthesis of information for the further development of the multilateral mechanism established under decision 15/9, including elements of a draft recommendation” provides guidance on this issue in Paragraph 11, which reads as follows (emphasis added):

11. The scale of the contributions to the fund should be established taking into consideration the overall intended scale of the fund, the number of contributors, **the degree to which revenue generated is dependent on the use of DSI** and the potential impact of the contribution on business activity and consumers, so that:

- (a) The overall size of the fund makes a significant contribution to the achievement of Goal D and Target 19 of the Kunming-Montreal Global Biodiversity Framework; [and]
- (b) **The scale of individual contributions to the fund is proportionate and reasonable, in the sense that businesses are not burdened with unsustainable costs** and that additional costs are not so significant that they are passed on to consumers to an extent that might generate new inflationary pressures.

Goal D of the GBF reads as follows:

Adequate means of implementation, including financial resources, capacity building, technical and scientific cooperation, and access to and transfer of technology to fully implement the Kunming-Montreal global biodiversity framework are secured and equitably accessible to all Parties, especially developing countries, in particular the least developed countries and small island developing States, as well as countries with economies in transition, **progressively closing the biodiversity finance gap of \$700 billion per year**, and aligning financial flows with the Kunming-Montreal Global Biodiversity Framework and the 2050 Vision for Biodiversity.

Target 19 of the GBF reads, in part, as follows:

Substantially and progressively increase the level of financial resources from all sources, in an effective, timely and easily accessible manner, including domestic, international, public and private resources, in accordance with Article 20 of the Convention, to implement national biodiversity strategies and action plans, **by 2030 mobilizing at least 200 billion United States dollars per year...**

Taken together, Paragraph 11, Goal D and Target 19 make clear that the highly ambitious objective of the global fund is to establish a broad contributor base that is capable of making “a significant contribution” toward “progressively closing the biodiversity finance gap of \$700 billion per year” and “mobilizing at least \$200 billion per year” by 2030. At the same time, Paragraph 11 seeks to balance “the degree to which revenue generated is dependent on the use of

DSI” and “the scale of individual contributions to the fund [to ensure they] are proportionate and reasonable, in the sense that businesses are not burdened with unsustainable costs.” As shown below, this balancing can be achieved by creating a contribution rate matrix that takes into consideration both the pertinence of GR, DSI and aTK to a company’s profits, as reflected in the chart above, and the size of a company based on profit and employment levels.⁵ The matrix approach seeks to create a fair and equitable contribution scheme by providing for higher contribution rates for larger, more profitable companies and companies that have a more direct nexus to the utilization of GR, DSI and/or aTK, and lower contribution rates for smaller, less profitable companies and companies that have a more indirect nexus to the utilization of GR, DSI and/or aTK.

GLOBAL FUND CONTRIBUTION RATE MATRIX (%)		Company Size (based on profit ranges & employment level)				
		Mega	Large	Medium	Small	Micro
Pertinence of GR, DSI and aTK to Company Profits	High	1.0	0.9	0.8	0.7	0.6
	Medium-High	0.9	0.8	0.7	0.6	0.5
	Medium	0.8	0.7	0.6	0.5	0.4
	Medium-Low	0.7	0.6	0.5	0.4	0.3
	Low	0.6	0.5	0.4	0.3	0.2

This particular contribution rate matrix applies a top rate of 1.0% in recognition of the current emphasis on that contribution rate in the negotiations. Assuming that profit is evenly distributed across companies of different sizes and that profit is distributed evenly across the entire value chain, this contribution rate matrix produces an average contribution rate of 0.60%. In reality, however, profits are extraordinarily skewed toward larger companies.⁶ Moreover, an approach that seeks to promote “proportionate and reasonable” individual contributions by applying the applicable contribution rate only to a company’s profits that arise from Genetic Utilization (as evidenced in audited data) will skew profits toward the higher pertinence categories. Accordingly, the amount of profits to which the contribution rates in each cell of the matrix will be applied will likely skew toward the larger, more profitable companies and companies for which GR, DSI and aTK are most pertinent to profits, i.e. toward the top left corner of the matrix. For that reason, a better way to gauge the overall contribution rate generated by this

⁵ It is envisioned that profit would be based on Generally Accepted Accounting Principles (GAAP) and would be able to be verified in audited public or private annual reports. A company’s size would be determined based on its total profits and employment level, however, if its annual report included an audited analysis of the company’s profits that arise from Genetic Utilization, the company would determine its contribution to the global fund by multiplying (i) the applicable contribution rate and (ii) only those profits that arise from Genetic Utilization. This approach would enable those companies with only a small percentage of profits for which GR, DSI and/or aTK are pertinent to avoid paying excessively, and unfairly, into the global fund by using audited financial data to ensure that “[t]he scale of individual contributions to the fund is proportionate and reasonable.” An ancillary benefit of this approach might be to disincentivize corporations from switching profits into non-CBD jurisdictions (like the US). With respect to a company’s size classification, the two-part test would be applied such that if the profit and employment levels produced different size classifications, the smaller size category would apply.

⁶ See, e.g., Mauboussin, Michael J. and Callahan, Dan, “Stock Market Concentration: How Much is Too Much?”, Morgan Stanley (June 4, 2024).

matrix may be to focus on the simple average of the top four bands in the matrix as outlined in bold, which equals 0.80%.

V. CONTRIBUTION RATE MATRIX WITH A TOP RATE OF 1.40%

The specific contribution rates reflected in the matrix presented in Section IV provide just one example from among an infinite range of possibilities and negotiators may determine that those specific contribution rates do not reflect a fair and equitable contribution scheme. For starters, an average contribution rate that falls well below the 1.0% contribution rate that has been a focus of the negotiations may be viewed as being unfair to the countries and IPLCs urgently in need of the maximum available funding to preserve and protect our planet’s biodiversity. In addition, the application of a gradient of -0.1% may be viewed as failing to sufficiently differentiate companies along the various size classifications and GR, DSI and aTK pertinence levels. These concerns suggest that a potentially fairer and more equitable approach may be to populate the matrix such that the **simple average of the top four bands in the matrix outlined in bold equals 1.00%**. However, any such approach would require increasing the top rate in which case the continued application of a -0.1% gradient could result in smaller companies for which GR, DSI and aTK are less pertinent to profits paying excessively, and unfairly, into the global fund relative to larger companies. Increasing both the top rate and the absolute value of the gradient simultaneously helps to address these concerns.

The contribution rate matrix shown below applies a top rate of 1.4% and a gradient of -0.2%, increasing the contribution rate dispersion from 0.4% in the Section IV matrix to 0.8% in this matrix. As noted above, the simple average of the top four bands as outlined in bold below equals 1.0%. When compared to the Section IV matrix, this approach leaves the middle contribution rate band unchanged at 0.6% and reduces the contribution rates for all of the lower bands, even entirely exempting Small-Low, Micro-Low and Micro-Medium-Low companies from any obligation to contribute at all. This exemption could help to address some of the business impact concerns that were raised in Decision 15/9. Concomitantly, the increases in contribution rates are focused predominantly on medium, large, and mega companies for which GR, DSI and aTK are more pertinent to profits. For all of these reasons, negotiators may view this version of the contribution rate matrix as being fairer and more equitable when juxtaposed with the Section IV matrix.

GLOBAL FUND CONTRIBUTION RATE MATRIX (%)		Company Size (based on profit ranges & employment level)				
		Mega	Large	Medium	Small	Micro
Pertinence of GR, DSI and aTK to Company Profits	High	1.4	1.2	1.0	0.8	0.6
	Medium-High	1.2	1.0	0.8	0.6	0.4
	Medium	1.0	0.8	0.6	0.4	0.2
	Medium-Low	0.8	0.6	0.4	0.2	0.0
	Low	0.6	0.4	0.2	0.0	0.0

VI. STAGED IMPLEMENTATION

In light of the GBF’s emphasis on scaling up contributions between now and 2030, it would make sense to stage the implementation of any matrix-based contribution scheme as shown below.

GLOBAL FUND CONTRIBUTION RATE MATRIX (%)		Company Size (based on profit ranges & employment level)				
		Mega	Large	Medium	Small	Micro
Pertinence of GR, DSI and aTK to Company Profits	High	COP 16	COP 16	COP 16	COP 17	COP 17
	Medium-High	COP 16	COP 16	COP 17	COP 17	COP 17/18
	Medium	COP 16	COP 17	COP 17	COP 17/18	COP 17/18
	Medium-Low	COP 17	COP 17	COP 17/18	COP 17/18	COP 17/18
	Low	COP 17	COP 17/18	COP 17/18	COP 17/18	COP 17/18

Staging the implementation of the payment rates in this manner would focus the immediate attention for COP 16 on the “large and transnational producers or companies”⁷ having the closest nexus to the utilization of GR, DSI and/or aTK, which dovetails with the current emphasis in the negotiations on industries that are “highly dependent” on the use of DSI, including (i) pharmaceuticals, (ii) cosmetics, (iii) plant and animal breeding and agricultural biotechnology, (iv) laboratory equipment associated with the use of DSI, and (v) information, scientific and technical services related to DSI. Staging the implementation would also provide the COP with the opportunity to evaluate the implementation of the highest-level contribution bands prior to seeking contributions from companies that fall in the remaining six bands, while, at the same time, placing those companies on notice that, as beneficiaries of Genetic Utilization, there is an expectation that they too will contribute in the future to the global fund albeit at lower contribution rates. Moreover, by delaying the implementation of those six bands those companies will have the ability to make plans for future contributions to the global fund. The matrix above envisions two different scenarios – staging the implementation across COP 16, COP 17 and COP 18 or combining the yellow and blue stages into a single second stage that would be implemented at COP 17.

V. CONCLUSION

The development of a fair and equitable contribution scheme for the Decision 15/9 Global Fund is vital to the long-term success of the fund and, even more importantly, to the preservation, restoration and protection of our planet’s biodiversity, which is the foundation of all human progress. Accordingly, any dialogue regarding the parameters of a fair and equitable contribution scheme must start from a good faith attempt to evaluate how much the private sector can reasonably contribute while avoiding overreach into businesses that are remote beneficiaries of the commercial utilization of GR, DSI and/or aTK. An attempt to address these issues was made in this paper by using value chain analysis to enumerate seven specific categories of businesses that benefit, i.e. earn profits, from Genetic Utilization and have a sufficiently close nexus to that utilization to reasonably expect that they would share those benefits with the global fund. The profits earned by businesses in each of these categories were classified as having high, medium-high, medium, medium-low and low pertinence to the utilization of GR, DSI and/or aTK. Those classifications were then paired with company size classifications to produce a 5x5 matrix-based contribution schemes where larger, more profitable companies and companies that

⁷ Convention on Biological Diversity, Ad Hoc Open-ended Working Group on Benefit-sharing from the Use of Digital Sequence Information on Genetic Resources, Second meeting, “Synthesis of information for the further development of the multilateral mechanism established under decision 15/9, including elements of a draft recommendation”, June 2024.

have a more direct nexus to the utilization of GR, DSI and/or aTK have higher rates of contribution, and smaller, less profitable companies and companies that have a more indirect nexus to the utilization of GR, DSI and/or aTK have lower rates of contribution. Importantly, all companies that benefit from Genetic Utilization by virtue of earning profits as part of the value chain are included – as a matter of fairness, each beneficiary in the value chain (except potentially for the smallest companies for which GR, DSI and aTK are least pertinent to profits) pays something and thereby lightens the sharing burden on every other beneficiary in that value chain and all other DSI-based value chains. A second matrix was also presented that increased the rates of contribution for larger companies for which GR, DSI and aTK are most pertinent to profits as well as the absolute value of the gradient used in constructing the matrix. For the reasons discussed in the paper, negotiators may view this second matrix as being fairer, more equitable and more consistent with the goals of the DSI Policies. Finally, a proposal was made to stagger the implementation of any matrix-based contribution scheme over COP 16, COP17 and potentially COP 18 to enable negotiators to focus on the larger, more profitable companies and companies that have a more direct nexus to the utilization of GR, DSI and/or aTK in the short-term, while providing a planning and preparation period for smaller, less profitable companies and companies that have a more indirect nexus to the utilization of GR, DSI and/or aTK.

ANNEX

AN EXAMPLE OF A MATRIX-BASED WEIGHTED AVERAGE CONTRIBUTION RATE ASSUMING UNEVENLY DISTRIBUTED PROFITS

The discussion in the paper initially assumed that the amount of profits to which the contribution rates presented in the matrices would apply are evenly distributed. In reality, however, profits are extraordinarily skewed toward larger companies.⁸ Moreover, an approach that seeks to promote “proportionate and reasonable” individual contributions by applying the applicable contribution rate only to a company’s profits that arise from Genetic Utilization (as evidenced in audited data) will skew profits toward the higher pertinence categories. Accordingly, the amount of profits to which the contribution rates in each cell of the matrix will be applied will likely skew toward the larger, more profitable companies and companies for which GR, DSI and aTK are most pertinent to profits, i.e. toward the top left corner of the matrix. The paper adjusted for this skew by focusing on the simple average of the top four bands in each matrix.

Another way of adjusting for this skew is to develop and apply a weighting matrix that estimates the distribution of profits across the different cells in the contribution rate matrix. A weighting matrix can be prepared by making assumptions regarding the distribution of profits across the five size classifications and five pertinence levels. One such set of assumptions is shown below in green.

ASSUMED PROFIT DISTRIBUTION MATRIX		Mega	Large	Medium	Small	Micro
		50%	25%	16%	8%	1%
High	40%	0.2	0.1	0.064	0.032	0.004
Medium-High	32%	0.16	0.08	0.0512	0.0256	0.0032
Medium	16%	0.08	0.04	0.0256	0.0128	0.0016
Medium-Low	8%	0.04	0.02	0.0128	0.0064	0.0008
Low	4%	0.02	0.01	0.0064	0.0032	0.0004

Since the size scale ratio is 50:1 and the pertinence scale ratio is 10:1, the profit distribution assumptions reflected above produce a 500:1 weighting matrix. While the data above and below both reflect a 500:1 scale, the matrix below shows the scale more clearly by restating the data to a minimum value of 1.

500:1 WEIGHTING SCALE MATRIX		Company Size (based on profit ranges & employment level)				
		Mega	Large	Medium	Small	Micro
Pertinence of GR, DSI and aTK to Company Profits	High	500	250	160	80	10
	Medium-High	400	200	128	64	8
	Medium	200	100	64	32	4
	Medium-Low	100	50	32	16	2
	Low	50	25	16	8	1

⁸ See, e.g., Mauboussin, Michael J. and Callahan, Dan, “Stock Market Concentration: How Much is Too Much?”, Morgan Stanley (June 4, 2024).

The Assumed Profit Distribution matrix can then be applied to the contribution rate matrices by multiplying the values in the corresponding cells of each matrix.⁹ Applying the Assumed Profit Distribution matrix to the Contribution Rate Matrix with a top rate of 1.40% produces the following weighted contribution rates for each cell.

500:1 WEIGHTED CONTRIBUTION RATES (%)		Company Size (based on profit ranges & employment level)				
		Mega	Large	Medium	Small	Micro
Pertinence of GR, DSI and aTK to Company Profits	High	0.2800	0.1200	0.0640	0.0256	0.0024
	Medium-High	0.1920	0.0800	0.0410	0.0154	0.0013
	Medium	0.0800	0.0320	0.0154	0.0051	0.0003
	Medium-Low	0.0320	0.0120	0.0051	0.0013	EXEMPT
	Low	0.0120	0.0040	0.0013	EXEMPT	EXEMPT

Summing the values in the matrix above reveals that the contribution rate matrix presented in Section V, when weighted using the 500:1 weighting matrix developed above, results in a weighted average contribution rate of 1.0221%.

⁹ Using the middle cell in each matrix as an example, approximately 2.56% of profits contribute at the rate of 0.6% on an annual basis, so the weighted contribution for that cell is 2.56% x 0.6%, which equals 0.01536% and rounds up to 0.0154%.