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Isolating the female agency-driven development factor in external sovereign emerging market debt

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Abstract

The underlying literature hypothesises and provides randomised evidence for the positive impact of promoting the broad-based inclusion, empowerment, and representation of women on regional ecosystems. This study seeks to isolate a female agency-driven development factor in external sovereign emerging market debt and finds evidence for superior risk-adjusted returns from tilting towards female agency leaders. We propose the female agency factor as an additional scope in the modern investor's toolbox of holistic credit assessment, allowing investors to isolate the issuers which are the most effective sovereign transmission mechanisms of sustainable development capital. This contribution to the corpus supports the notion of integrating sustainability factors into portfolio construction and reinforces the argument for supporting female-led development from a financial markets' perspective.

Keywords: Sovereign, Fixed income, Emerging markets, Sustainability, Female agency

Introduction

Inspired by the underlying literature, this paper explores the relationship between gender equality and sovereign creditworthiness in developing markets, with a focus on the potential for the promotion of female agency to support development. The problématique explores and considers whether the purported benefits of female agency-driven development are internalised by capital markets; we motivate the question: do the bonds issued by economies with a greater degree of female agency outperform those issued by economies with a lesser degree of female agency? We hypothesise that more gender-equal economies allocate resources more optimally, although we do not infer causation, reflecting on future economic development and growth—and that such a halo effect is discounted in traditional assessments of sovereign creditworthiness. As such, we expect the local capital markets of more gender-equal economies, the most effective transmission mechanisms of sustainable development capital, to outperform less gender-equal peers over time, justifying relative allocation to more gender-equal economies from the perspective of risk-adjusted financial returns.

We begin by contextualising the question and discussing the importance of female agency in developing markets, particularly as a source of sustainable development. Next, we provide an overview of our research methodology; the study approaches the problématique by seeking to isolate a female agency factor, the first known study to attempt this, by integrating a framework developed by Henide (2021) into the iBoxx USD Emerging Market Sovereigns Index ("the benchmark") to construct factor portfolios across three key verticals (politics, economics, society) from leader and laggard portfolios. This is similar to the first-known approach for examining factors in sovereign emerging debt by Brooks et al. (2020) and the first-known approach for examining factors in emerging market credit by Dekker et al. (2021),¹ for further assessment. We conclude by summarising our findings, which support the notion that integrating sustainability risks can be a source of superior risk-adjusted returns and reinforce the argument for supporting female-led development from a financial markets perspective. The findings motivate questions for further investigation, such as whether there is a causal relationship between promoting female agency and reducing the credit risk for sovereign issuers, which has broader and deeper financial markets implications.

Contextual background

The academic literature suggests that rebalancing societies to provide women with a greater degree of inclusion, representation, and autonomy has a favourable influence on local ecosystems, both helping to prevent objectionable social activities and facilitating socially and economically-additive behaviour; the correlation between gender equality and reduced poverty in developing markets is demonstrated clearly by academics (Filmer 1999; Sinha et al. 2007; Strauss and Thomas 1995; World Bank 2001). Esther Duflo, a co-recipient of the 2019 Nobel Memorial Prize in Economic Sciences,² also found in her seminal paper (2012) that "women's empowerment and economic development are closely interrelated" (pp.1076).

Sowing female inclusion, equality, and empowerment into communities reaps not only rewards for the women of the community but also for men and future generations through more constructive household outcomes (Duflo 2003; Duflo and Udry 2004; Hoddinott and Haddad 1995; Pitt and Khandker 1998; Pitt et al. 2003; Rubalcava et al. 2004; Thomas 1997). This perceived halo effect has given rise to the prevalence of the gender factor in development theory and postmodernist thought; reminiscent of the aforementioned studies, Eastin and Prakash (2013) point to women's intrahousehold bargaining power and hypothesise that the opportunity of developing human capital is a vehicle for conferring greater political and social recognition, providing a rationale for the role of gender equality as a transmission mechanism for economic development, particularly amongst economies in the earlier stages of their economic development.

¹ Brooks et al. (2020) and Dekker et al. (2021) were preceded by factor studies in emerging market equities (Cakici et al. (2013); Hanauer and Linhart (2015); Blitz et al. (2013); Hanauer and Lauterbach (2019); Fang and Olteanu-Veerman (2020)) as well as in corporate bonds (Houweling and Van Zundert (2017); Israel et al. (2018); Henke et al. (2020); Bektić et al. (2019)).

² Co-received alongside Abhijit Banerjee and Michael Kremer, the prize was awarded for the pioneering use of randomised control trials (RCTs) in studying poverty-prevention, a sample of which trials are referenced in this study to justify the additionality of gender equality and the choice of the concepts used to assess gender equality.

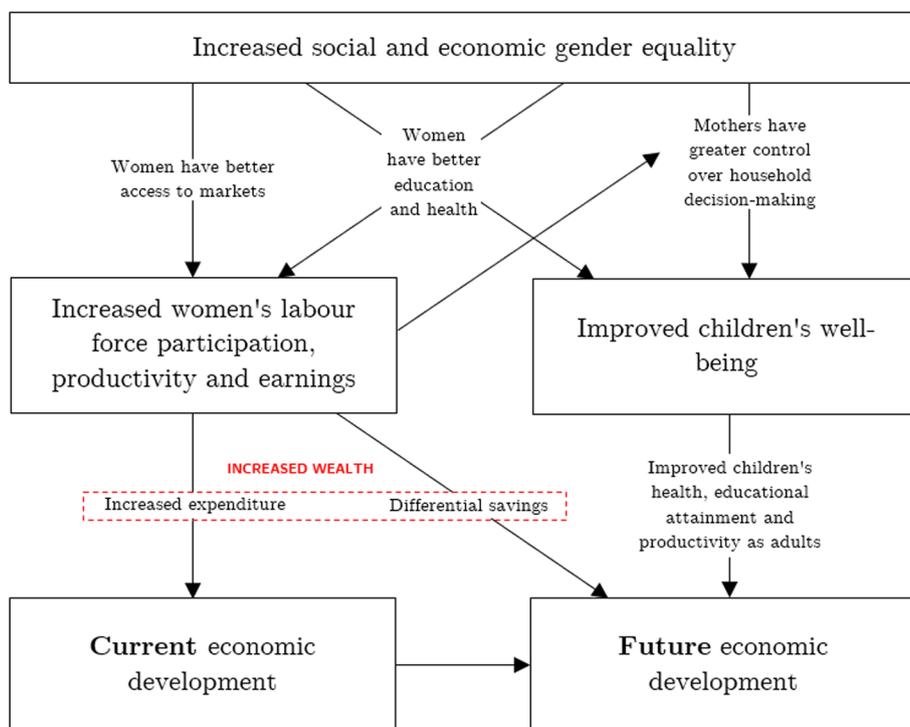


Fig. 1 Gender equality: A pathway for developing local ecosystems

The bridge between improved gender equality and improved economic outcomes is encapsulated succinctly by the framework of Sinha et al. (2007), adapted in Fig. 1.

Adapted from Sinha et al. (2007)

Improving the gender balance across economies is core to improving their social and governance profile, as well as underpinning their future growth potential. The underlying framework,³ that we integrate, references three verticals ('Politics', 'Economics' and 'Society') which derive from the pillars of equality identified in the United Nations Sustainable Development Goals (UN SDGs) target 10.2. There is a comprehensive body of academic literature that justifies the pillars identified in the UN SDGs target 10.2 and the rationale behind the sustainable socioeconomic transformations achieved through the improvement of women's social and economic outcomes' although UN SDG 10.2 stipulates the inclusion of "all, irrespective of age, sex, disability, race, ethnicity, origin, religion or economic or other status", we focus in this study only on matters pertaining to gender-based inclusion, relating to the characteristics of women and men constructed by socialisation, rather than the biological and physiological characteristics implied by "sex" (Deaux 1985). We highlight the concepts within the verticals and some key readings that attest to their significance in Table 1. The concepts are based on the framework indicators, which are a subset of the multi-source Tier 1 data ascribed in the UN Minimum Set of [Gender] Indicators (UN MSoGI).

³ The framework methodology and academic intuition are articulated in Henide, K., 2021. Assessing Developing Countries' Sovereign Creditworthiness: A Female Agency Framework. dx.doi.org/10.2139/ssrn.3896641.

Table 1 Supporting literature. *Source:* Authors

Vertical	Concept	Academic reference
Political	National parliament representation Ministerial representation	Chattopadhyay and Duflo (2004); Duflo (2012); Halim et al. (2016); Sen and Mukherjee (2014); High-Pippert and Comer (1998)
Economics	Labour force participation Financial inclusion	Ashraf (2019); Banerjee (2019); Cheston and Kuhn (2002); Gates (2014); Eastin and Prakash (2013); Hashemi et al. (1996); Kabeer (2001); Lakwo (2006); Osmani (2007); Pitt and Khandker (1996); Pitt et al. (2006); Swain and Wallentin (2009); Krumbiegel et al. (2020)
Society	Youth literacy Primary education enrolment Adolescent birth rate Gender-based violence (GBV)	Afridi (2010); Bolis and Hughes (2015); Gallaway and Bernasek (2004); Goldin (1994); Goldin and Katz (2002); Heise and Gottemoeller (1999); Levine et al. (2001); Mocan and Cannonier (2012)

The framework

The pillars of inclusion, equality, and empowerment

‘Politics’, ‘Economics’, and ‘Society’ (collectively, abbreviated to ‘PES’) are the three key pillars of female equality that ensure that women are free, represented, included, and empowered. They align with the spirit of UN SDG target 10.2. To capture sovereign performance across these verticals, we introduce eight concepts built upon Tier 1 data published by the World Bank under Creative Commons 4.0 licensing. The concepts and multi-source indicators are recognised by the United Nations (UN) and are upheld as key developmental indicators, contained in the UN Minimum Set of Gender Indicators.⁴ Based on the UN’s evaluation, we provide a mapping of each indicator to the specific strategic objectives outlined by UN Women (1995) in the Beijing Platform for Action (BPA), as well as the goals (and targets, where applicable) set out by the UN (2015) in the Sustainable Development Goals (SDGs).

The categorisation of the indicators as ‘Tier 1’ is designated by UN Women through the curation of the Minimum Set of [Gender] Indicators. The classification confirms that the indicator ‘addresses relevant issues related to gender equality and/or women’s empowerment; is conceptually clear and has an internationally established methodology and standards’. Additionally, the classification confirms that the underlying data ‘are regularly produced by countries, with sufficient coverage to allow tracking progress over time’.

We reproduce, in Table 2, the indicators referenced in the framework, by vertical, their mapping and the source(s) of the data. A table consisting of all project data source permalinks is available in Table 8 (appendix, Exhibit 4).

Where specified, ‘GAP’ concepts are all proprietary gender-relative derivations that seek to align scores for comparability, equilibrating for structural differences in economic infrastructure, looking specifically to assess gender (dis)parity. Concepts not labelled ‘GAP’ are strictly measures of absolute outcomes relating to the respective region’s eligible female population subset.

⁴ Developed by the Inter-agency and Expert Group on Gender Statistics.

Table 2 Indicators referenced in the framework. *Source:* Authors

	Indicator	UN BPA, SDG (and target) mapping	Source
Politics	Women's share of government ministerial positions ^{GAP}	G.1, Goal 5	Inter-Parliamentary Union (IPU)
	Proportion of seats held by women in (a) national parliaments and (b) local governments ^{GAP}	G.1, Goal 5 (t.5)	IPU, UN Women
Economics	Labour force participation rate for persons aged 15–24 and 15+, by sex ^{GAP}	F.1, H.3, Goal 8	International Labour Organization (ILO)
	Proportion of adults (15 years and older) with an account at a bank or other financial institution or with a mobile-money-service provider, by sex ^{GAP}	F.1, F.2, Goal 8 (t.10)	World Bank (WB)
Society	Youth literacy rate of persons (15–24 years), by sex ^{GAP}	B.2, L.4, Goal 4	UNESCO Institute for Statistics (UIS)
	Adjusted net enrolment rate in primary education, by sex ^{GAP}	B.1, L.4, Goal 4	UIS
	Adolescent birth rate (aged 10–14 years; aged 15–19 years) per 1,000 women in that age group	L.1, L.2, Goal 3 (t.7)	UN Development Programme (UNDP)
	Prevalence of violence in the lifetime	D.1, D.2, Goal 5 (t.2)	OECD, WHO, UNSD, UNICEF, UN Women, UNODC, UNFPA

The framework also references (inverse) inequality-adjusted GNI per capita, γ , defined:

$$\gamma = \frac{g(\text{GDP} + (F_1 - F_0))}{n}$$

where: g =Gini coefficient, GDP =Gross Domestic Product, F_1 =Foreign inflows, F_0 = Foreign outflows and; n = Population

An extensive discussion of the framework and methodology is provided by Henide (2021). All the data was accessed in November 2020. Annual data was sourced for 2010–2020, inclusive.

Equilibrating sustainability performance

Following the framework, an 'Overall PES Score' is calculated as a weighted average of the scores obtained and manipulated from the underlying data. Introducing a secondary axis, the IIGNI, provides a multi-dimensional scope for the investment universe and a counterbalance for greater comparability. In particular, the space allows investors to introduce a minimum baseline function, which provides an implied sustainability score for each vertical at each IIGNI increment. The sources for the underlying data used to construct the IIGNI are provided in Table 3.

Table 3 Data used to calculate the IIGNI. *Source:* Authors

Indicator	Source
GNI per capita, Atlas method (US\$)	World Bank, OECD
Gini index (World Bank estimate)	World Bank

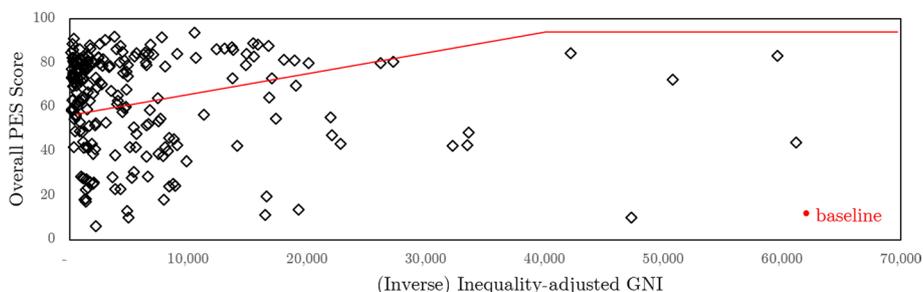


Fig. 2 Introducing a progressive baseline scoring function. *Source:* World Bank, Authors

The framework prescribes a baseline function:

$$f(x) = \begin{cases} (\frac{7x}{8000}) + 55 & \text{if } 0 < x < 40,000 \\ 90 & \text{if } 40,000 < x < \infty \end{cases}$$

We transplant the default baseline function prescribed by Henide (2021) into our study, as illustrated by the 'baseline' in Fig. 2. The prescribed function is ideal in our setting as it exhibits goodness of fit and is progressive by nature. By inherent design, the baseline requires that countries with a higher degree of GNI per head and/or lower equality of wealth distribution (measured by the Gini coefficient) deliver higher scores in the aggregate across the 'PES' verticals to 'breakeven' with the relative performance of countries with a lower degree of GNI per head and/or higher equality of wealth distribution.

The equilibration concept and the derivation of relative performance versus the defined baseline scoring function allows investors to better compare issuers within the universe. An assessment of relative performance and the absolute 'Overall PES Score,' indicates a consistent trend in scoring and relative performance, but allows us to isolate clusters of inferior issuers whose scoring is in-line with 'less wealthy' countries or those with a greater equality of wealth distribution. Conversely, we can identify countries with a superior 'Overall PES Score' performance relative to peers of a similar level of (inequality-adjusted) 'wealth.' We can also isolate clusters across the curve of sovereigns that under/outperform on an absolute level (the quadrants to the left of the universal minimum and those to the right of the universal minimum, respectively) and on a relative level (sovereigns that demonstrate a negative relative performance and those which

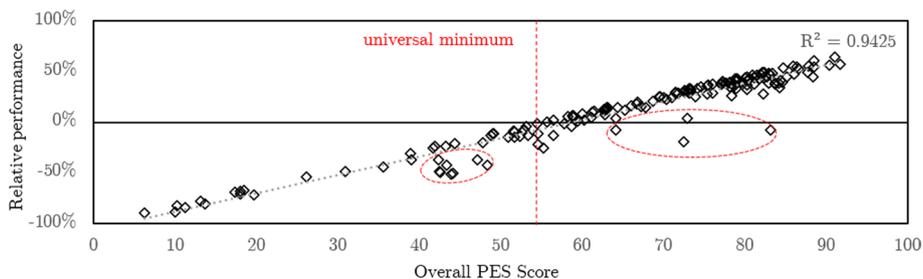


Fig. 3 Plotting the PES performance curve. *Source:* World Bank, Authors

demonstrate a positive relative performance, respectively), as highlighted in Fig. 3.⁵ The PES performance curve can also be used to calibrate and therefore reverse-engineer the baseline function; users may wish to 'fit' or benchmark baseline PES performance to a given set of country profiles, to which they can align the universal minimum and/or the PES performance curve.⁶

Quantifying the relative performance of sovereign issuers across the key pillars of female empowerment provides us with an additional socially conscious scope with which to assess the development of developing countries and to determine portfolio capital allocation. For the purposes of our study, our focus will be solely on the relative performance of issuers.

Introducing a stratification that is progressive and relates to economic wealth overcomes some of the challenges with existing forms of ESG factor integration, such as negative exclusion based on objective ESG laggards, which contributes to a set of economic incentives that perpetuate a self-enforcing capital bifurcation cycle and entrench ESG laggards, particularly developing market countries, in a development trap (Henide 2021).

Isolating the female agency-driven development factor

Constructing long-only portfolios

We apply the framework methodology to output relative performance,⁷ the difference between the actual and implied scores divided by the implied score, for the sovereign issuers represented in the iBoxx USD Emerging Markets Sovereigns Index, "the benchmark".

We construct two sets of long-only portfolios in Fig. 4. The first set consists of market-value weighted portfolios containing all of the bonds in the benchmark issued by the top

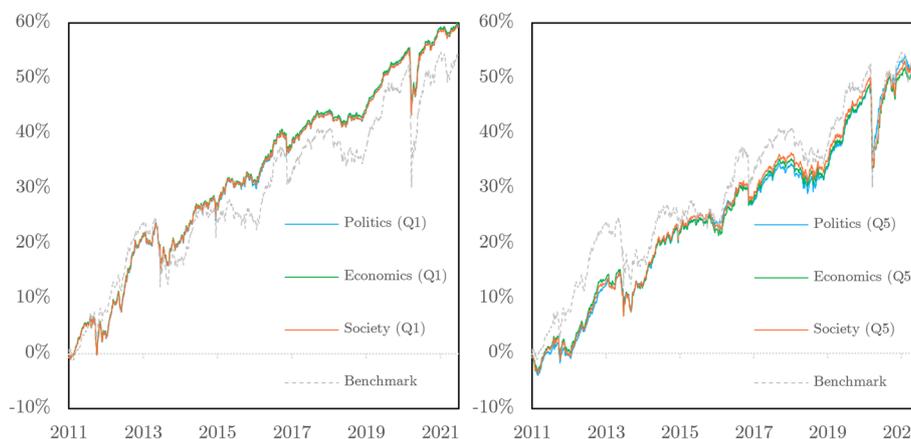


Fig. 4 Cumulative log returns of the long-only leader and laggard portfolios. *Source:* IHS Markit, World Bank, Authors

⁵ The annotated clusters were identified optically rather than formulaically, although clustering techniques can be leveraged to systematically identify groups of characteristically similar sovereign PES profiles. The bottom-left quadrant represents a group of absolute and relative PES underperformers, whilst the bottom-right quadrant represents a group of absolute outperformers but relative underperformers.

⁶ Users may also wish to optimise for goodness of fit, for example, by optimising the resultant R-squared, assuming model linearity.

⁷ This was calculated for each individual vertical, using the aforementioned baseline function.

quintile (Q1) of sovereign issuers based on an issuer ranking by 'performance margin' for each individual factor. Conversely, the second set consists of market-value weighted portfolios containing all of the bonds in the benchmark issued by the bottom quintile (Q5) of sovereign issuers based on an issuer ranking by 'performance margin' for the Overall PES score as well as for each individual factor.⁸ In-line with the universe, issuers are re-assessed and re-ranked periodically, at every month-end rebalancing, to eliminate survivorship bias.

Deriving excess return portfolios

To better illustrate the performance of our leader and laggard portfolio sets, we calculate a cumulative log excess return relative to the cumulative log return of the benchmark in Fig. 5. We find that the portfolios of leaders have a higher cumulative log return from inception than the benchmark across the majority of months, whilst portfolios of laggards have a lower cumulative log return than the benchmark across the majority of months in the study window.

The high degree of pairwise correlation demonstrated in Table 4 may suggest some redundancy among the framework pillars and data inputs, but all elements of the framework are retained for the fullness of the assessment; the female agency

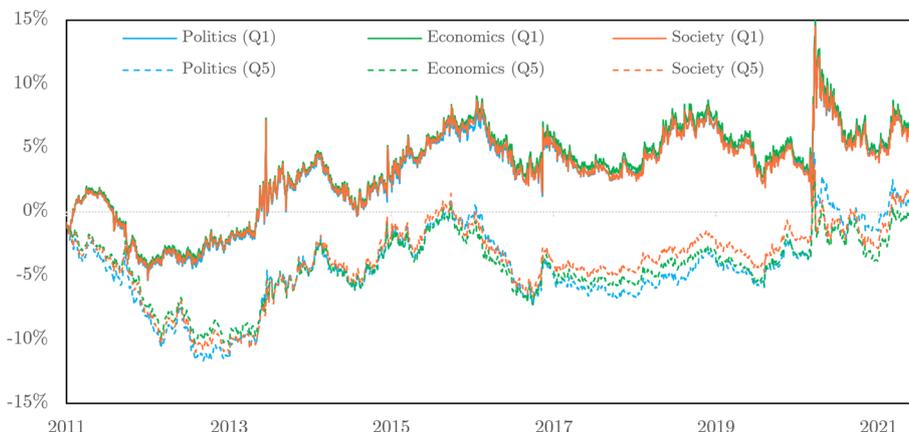


Fig. 5 Leader and laggard excess return versus the benchmark. *Source:* IHS Markit, World Bank, Authors

Table 4 The factors demonstrate a high degree of pairwise correlation. *Source:* IHS Markit, World Bank, Authors

	Top quintile (Q1)				Bottom quintile (Q5)			
	Overall	Politics	Economics	Society	Overall	Politics	Economics	Society
Overall	100.00%				Overall	100.00%		
Politics	99.71%	100.00%			Politics	96.24%	100.00%	
Economics	99.97%	99.69%	100.00%		Economics	99.78%	95.37%	100.00%
Society	99.98%	99.65%	99.93%	100.00%	Society	99.90%	95.81%	99.57%

⁸ We refer to Q1 and Q5 portfolios as 'leaders' and 'laggards', respectively.

Table 5 Calendar returns of the Overall PES leader and laggard portfolios. *Source:* IHS Markit, World Bank, Authors

	Average monthly log returns			Annual log returns			
	Bottom quintile (%)	Benchmark (%)	Top quintile (%)		Bottom quintile	Benchmark	Top quintile
2011	0.001	0.031	0.015	2011	0.855	7.761	4.672
2012	0.049	0.059	0.066	2012	12.984	15.522	17.350
2013	-0.003	-0.026	-0.004	2013	-0.690	-6.695	-0.973
2014	0.038	0.029	0.027	2014	9.742	7.384	6.821
2015	0.003	-0.001	0.016	2015	0.678	-0.270	4.163
2016	0.020	0.032	0.025	2016	5.484	8.600	6.743
2017	0.029	0.033	0.024	2017	6.845	7.873	5.650
2018	-0.005	-0.015	0.001	2018	-1.269	-3.811	0.262
2019	0.051	0.051	0.038	2019	12.939	12.998	9.549
2020	0.015	0.018	0.020	2020	3.740	4.657	5.174
YTD	0.015	0.000	0.004	YTD	2.196	-0.117	0.414
Average	0.0197	0.0202	0.0219	Cumulative	53.3545	54.5784	59.4088

framework does not look to prescribe variables that provide significance and additionality in determining asset pricing, but rather a scorecard for measuring gender equality holistically. Said differently, the selection of the pillars looks to satisfy conceptual wholeness and the prescribed pillars together constitute the definition of the female agency factor; the ‘combination’ of the factors in this context is unencumbered by multicollinearity as they otherwise would be had they been selected as independent variables in a model that sought to relate to a given dependent variable, for example. Regardless, the factors are isolated across each individual vertical for context and, as explored in the study, the high pairwise correlation is a result of, and a testament to, the regional consistency among sustainability hegemony across key female agency concepts. The co-relationship between the pillars is further illustrated in Fig. 8 (appendix, Exhibit 2) (Table 5).

The membership and respective weightings of the top and bottom quintile portfolios for the most recent month in the study and further descriptive statistics are produced in Table 6 (appendix, Exhibit 1) and Table 7 (Appendix, Exhibit 2), respectively. An additional assessment of the leader and laggard portfolios’ sensitivities to key benchmarks is also provided, in Fig. 9 (Appendix, Exhibit 3).

Deriving factor portfolios

We combine the long-only leader and laggard portfolios, by subtracting the cumulative log returns of the laggards from the cumulative log returns of the leaders (Q1–Q5), to derive factor performance in Fig. 6, deconstructing the average monthly log returns of the overall bottom and quintile portfolios in Table 5.

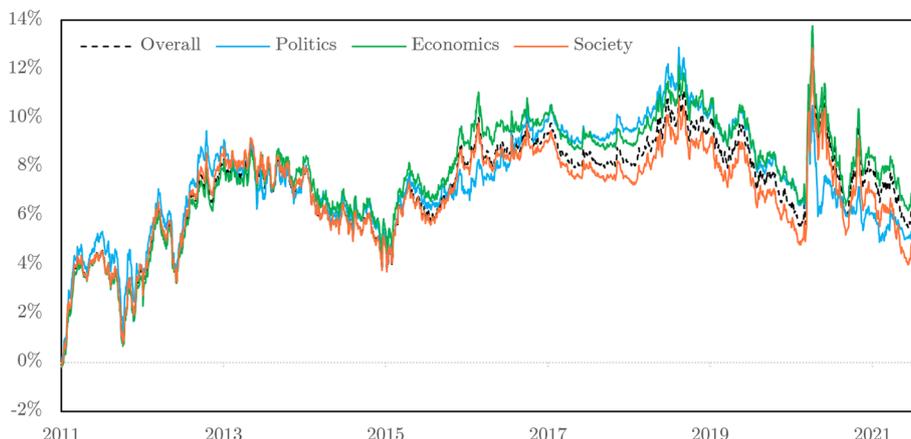


Fig. 6 Cumulative log returns of the factor portfolios. Source: IHS Markit, World Bank, Authors

Triangulating leader and laggard portfolios’ social and governance profile

Triangulating the academic findings that societies with a greater degree of female agency have a stronger social and political infrastructure, we introduce a dataset based on an independent methodology and sources: the Freedom House ‘Global Freedom Total Scores.’

A ‘Global Freedom Total Freedom Score’ is a combination of a country or territory’s political rights and civil liberties and is referenced as a proxy for the protection of citizens across the socioeconomic spectrum from discrimination, repression, and the infringement of their fundamental rights. We calculate the hypothetical ‘Global Freedom Total Score’ for the overall leader and laggard portfolios based on the portfolio constituents for each year of history (2012–2021, inclusive) and plot the results against the portfolios’ hypothetical IIGNI.

Corroborating the literature, the leader portfolio consistently captured ‘freer’ countries, as illustrated in Fig. 7. Furthermore, the leader portfolio displayed ‘stickiness’ (less year-on-year variability); leader countries demonstrated hegemony across all three factors and were also likely to maintain their hegemony over time, the reverse was true for laggard portfolios.

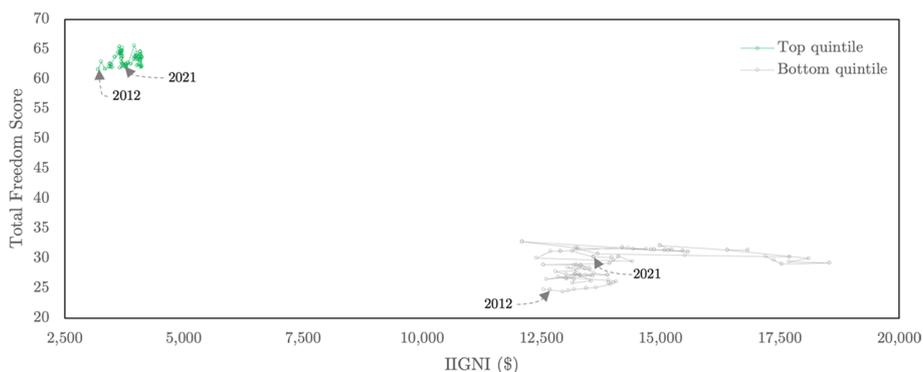


Fig. 7 Leaders are, consistently, freer. Source: IHS Markit, World Bank, Freedom House, Authors

Conclusion

In this paper, we integrate a female agency-driven development framework in the systematic construction of factor portfolios to assess whether bonds issued by economies with a greater degree of gender equality outperform those issued by economies with a lesser degree of gender equality from within the iBoxx USD Emerging Markets Sovereigns Index universe. We hypothesise that this approach to integrating sustainability considerations should contribute to financial gains for investors, from a halo effect that is otherwise discounted by traditional assessments of creditworthiness. Furthermore, we propose that the consideration of female agency-driven development widens the investor toolbox for assessing sovereign creditworthiness and allows investors to construct portfolios more optimally with respect to isolating the most effective sovereign transmission mechanisms of sustainable development capital.

Through developing factor portfolios, we find that a portfolio of issuers in the top quintile of performers⁹ across either of the three verticals (Politics, Economics, Society, collectively abbreviated to 'PES') outperformed their peers in the bottom quintile of performers across each respective vertical in the long-run.

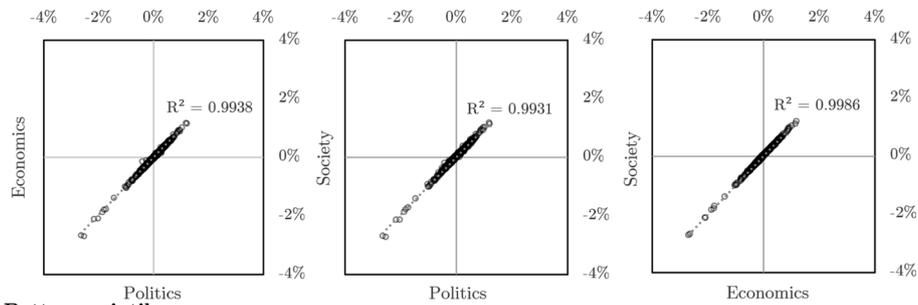
Additionally, we find that the top quintile performers across all of the verticals and over time tended to be from a narrow cluster, causing the top quintile performers to register a similar performance and demonstrate a high degree of pairwise correlation. This cluster was narrower than the laggard cluster (although laggard portfolios were also subject to a high degree of pairwise correlation). The hegemony of the top quintile of performers across time contributed to a 'stickier' portfolio and a lower cumulative portfolio turnover over the study window.

Triangulating the top and bottom quintile portfolios with Freedom House 'Global Freedom Total Scores', an external dataset with an independent methodology and data sources, we corroborate the underlying academic literature, proposing the intuition that citizens whose countries have a higher degree of female inclusion, equality, and empowerment provide a benefit to and benefit from a higher degree of political rights and civil liberties.

The findings are constructive in contextualising the behaviour of the debt issued by more gender-equal economies versus their less gender-equal peers but do not necessarily establish an explicit causal relationship between gender equality and factor out-performance. There is scope for further research to consider and establish a causal relationship for the impact of female agency on the credit risk of top quintile versus bottom quintile sovereign issuers over time.

⁹ 'Performance' is a relative concept, derived by comparing the actual scoring of an issuer versus their implied scoring, based on their calculated 'IIGNI', a proprietary proxy for wealth, adjusted for (or, 'deflated' by) the equality of wealth distribution of the respective country, where the Gini coefficient is used as an inverse adjustment factor. Deflating the wealth of countries with a greater equality of wealth distribution is seen to be favourable as the 'baseline' against which relative performance is measured is predominantly a progressive concept; countries with a higher IIGNI often must score higher than peers with a lower IIGNI in order to 'breakeven' with their minimum scoring expectations.

Top quintile



Bottom quintile

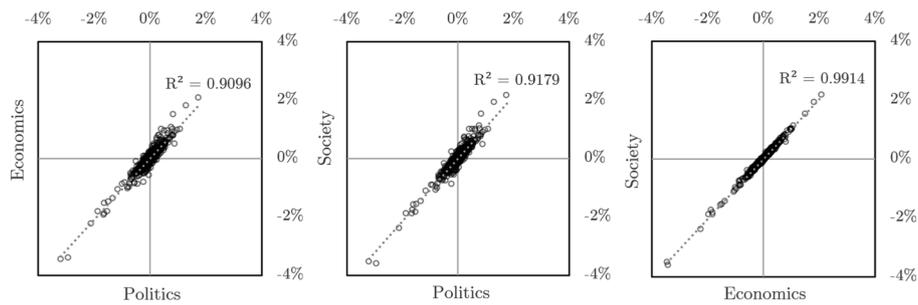


Fig. 8 Monthly log returns by factor pairings. *Source:* IHS Markit, World Bank, Authors

Exhibit 3

Table 8 and Fig. 9.

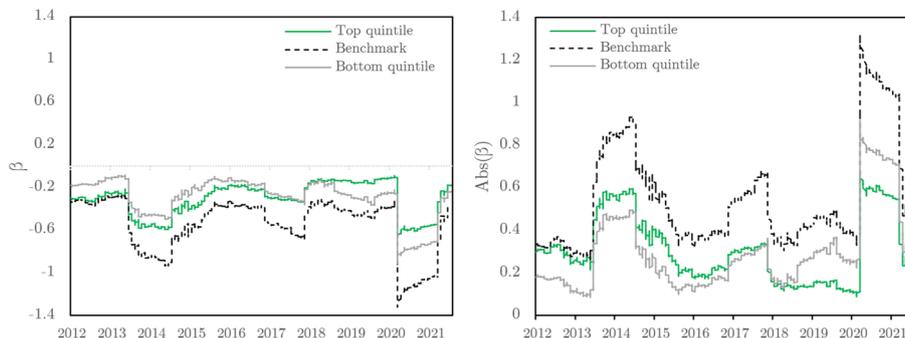
Table 8 Data permalinks

Concept	Source	Permalink
Proportion of seats held by women in national parliaments (%)	Inter-Parliamentary Union (IPU) (ipu.org). For the year of 1998, the data is as of August 10, 1998	https://data.worldbank.org/indicator/SG.GEN.PARL.ZS
Proportion of women in ministerial level positions (%)	Inter-Parliamentary Union (IPU) (ipu.org)	https://databank.worldbank.org/source/gender-statistics/Series/SG.GEN.MNST.ZS#
Labor force, female (% of total labor force)	Derived using data from International Labour Organization, ILOSTAT database. The data retrieved on January 29, 2021	https://data.worldbank.org/indicator/SL.TLF.TOTL.FE.ZS

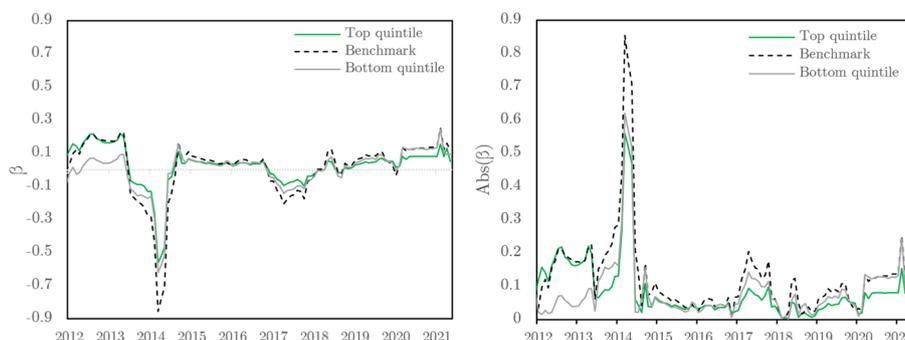
Table 8 (Continued)

Concept	Source	Permalink
Account ownership at a financial institution or with a mobile-money-service provider, female (% of population ages 15 +)	Demircuc-Kunt et al., 2018, Global Financial Inclusion Database, World Bank	https://data.worldbank.org/indicator/FX.OWN.TOTL.FE.ZS
Account ownership at a financial institution or with a mobile-money-service provider, male (% of population ages 15 +)	Demircuc-Kunt et al., 2018, Global Financial Inclusion Database, World Bank	https://data.worldbank.org/indicator/FX.OWN.TOTL.MA.ZS
Literacy rate, youth female (% of females aged 15–24)	UNESCO Institute for Statistics (uis.unesco.org). Data as of September 2020	https://data.worldbank.org/indicator/SE.ADT.1524.LT.FE.ZS
Literacy rate, youth male (% of males aged 15–24)	UNESCO Institute for Statistics (uis.unesco.org). Data as of September 2020	https://data.worldbank.org/indicator/SE.ADT.1524.LT.MA.ZS
Children out of school, female (% of female primary school age)	UNESCO Institute for Statistics (uis.unesco.org). Data as of September 2020	https://data.worldbank.org/indicator/SE.PRM.UNER.FE.ZS?view=chart
Children out of school, male (% of male primary school age)	UNESCO Institute for Statistics (uis.unesco.org). Data as of September 2020	https://data.worldbank.org/indicator/SE.PRM.UNER.MA.ZS?view=chart
Adolescent fertility rate (births per 1,000 women ages 15–19)	United Nations Population Division, World Population Prospects	https://data.worldbank.org/indicator/SP.ADO.TFRT
Percentage of ever-partnered women who ever suffered intimate partner physical and/or sexual violence	OECD (SIGI)	https://stats.oecd.org/Index.aspx?DataSetCode=GIDDB2019#
GNI per capita, Atlas method (current US\$)	World Bank national accounts data, and OECD National Accounts data files	https://data.worldbank.org/indicator/NY.GNP.CAP.CD?name_desc=true
Gini index (World Bank estimate), 0 to 1	World Bank, Development Research Group. Data are based on primary household survey data obtained from government statistical agencies and World Bank country departments. For more information and methodology, please see PovcalNet (iresearch.worldbank.org/PovcalNet/index.htm)	https://data.worldbank.org/indicator/SI.POV.GINI

Beta to the Trade Weighted U.S. Dollar Index (Broad)



Beta to the Global Brent benchmark



Beta to the CPI-U (Seasonally adjusted)

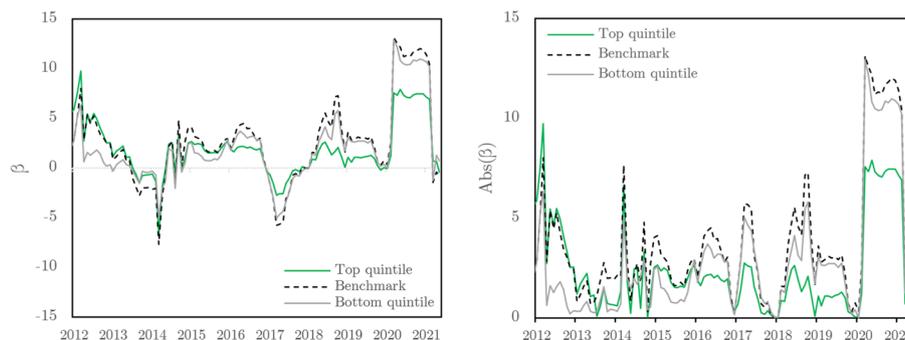


Fig. 9 Overall PES leader and laggard portfolio sensitivities. *Source:* IHS Markit, World Bank, FRB, IMF, U.S. Bureau of Labor Statistics, Authors

Abbreviations

BPA	Beijing platform for action
ESG	Environmental, social and governance
GDP	Gross domestic product
GNI	Gross national income
IIGNI	Inverse inequality-adjusted GNI per capita
PES	The 'Politics', 'Economics' and 'Society' verticals
Q1	Top quintile
Q5	Bottom quintile
RCTs	Randomised control trials
UN	United Nations
UN MSoGI	United Nations Minimum Set of [Gender] Indicators
UN SDGs	United Nations Sustainable Development Goals

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KH (framework development, methodology, quantitative research, literature review and writing), ZA (index engineering, framework review, methodology validation, analytics processing).

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References

- Afridi F (2010) Women's empowerment and the goal of parity between the sexes in schooling in India. *Popul Stud* 64(2):131–145
- Ashraf N (2009) Spousal control and intra-household decision making: an experimental study in the Philippines. *Am Econom Rev* 99(4):1245–1277
- Atkinson AB (1970) On the measurement of inequality. *J Econom Theory* 2(3):244–263
- Banerjee M (2019) Gender equality and labour force participation: mind the gap. *ANTYAJAA: Indian J Women Soc Change* 4(1):113–123
- Bektić D, Wenzler J-S, Wegener M, Schiereck D, Spielmann T (2019) Extending Fama-French factors to corporate bond markets. *J Portfolio Manag* 45(3):141–158
- Blitz D, Pang J, Van Vliet P (2013) The volatility effect in emerging markets. *Emerg Mark Rev* 16:31–45
- Bolis M and Hughes C (2015) Women's economic empowerment and domestic violence: links and lessons for practitioners working with intersectional approaches
- Brooks J, Richardson S, Xu Z (2020) (Systematic) investing in emerging market debt. *J Fixed Income* 30(2):44–61
- Cakici N, Fabozzi F, Tan S (2013) Size, value, and momentum in emerging market stock returns. *Emerg Mark Rev* 16:46–65
- Chattopadhyay R, Duflo E (2004) Women as policy makers: evidence from a randomized policy experiment in India. *Econometrica* 72(5):1409–1443
- Cheston S, Kuhn L (2002) Empowering women through microfinance. *Draft, Oppor Int* 64:1–64
- Deaux K (1985) Sex and gender. *Annu Rev Psychol* 36(1):49–81
- Dekker L, Houweling P, Muskens F (2021) Factor investing in emerging market credits. *J Beta Invest Strateg* 12(2):28–46
- Duflo E (2003) Grandmothers and granddaughters: old-age pensions and intrahousehold allocation in South Africa. *World Bank Econom Rev* 17(1):1–25
- Duflo E (2012) Women empowerment and economic development. *J Econom Lit* 50(4):1051–1079
- Duflo E and Udry C R (2004) Intrahousehold resource allocation in Cote d'Ivoire: social norms, separate accounts and consumption choices. NBER, Working paper 10498. <https://doi.org/10.3386/w10498>
- Eastin J, Prakash A (2013) Economic development and gender equality: Is there a gender Kuznets curve? *World Politics* 65(1):156–186
- Fang D, Olteanu-Veerman D (2020) The case for factor investing in China a shares. *J Index Invest* 11(2):76–91
- Filmer D (1999) The structure of social disparities in education: gender and wealth. Policy research report on gender and development. Working paper series, No. 5
- Floro M and Wolf J M (1990) The economic and social impacts of girls' primary education in developing countries. Washington, DC: USAID/AFR, The Advancing Basic Education and Literacy (ABEL) Project.
- Gallaway JH, Bernasek A (2004) Literacy and women's empowerment in Indonesia: implications for policy. *J Econ Issues* 38(2):519–525
- Gates M (2014) Putting women and girls at the center of development. *Science* 345(6202):1273–1275
- Goldin C, Katz LF (2002) The power of the pill: oral contraceptives and women's career and marriage decisions. *J Polit Econ* 110(4):730–770
- Goldin C (1994) The U-shaped female labor force function in economic development and economic history (No. 4707). National Bureau of Economic Research, Inc.
- Halim N, Yount KM, Cunningham SA, Pande RP (2016) Women's political empowerment and investments in primary schooling in India. *Soc Indic Res* 125(3):813–851
- Hanauer MX, Linhart M (2015) Size, value, and momentum in emerging market stock returns: integrated or segmented pricing? *Asia Pac J Financ Stud* 2:175–214
- Hanauer MX, Lauterbach JG (2019) The cross-section of emerging market stock returns. *Emerg Mark Rev* 38:265–286
- Hashemi SM, Schuler SR, Riley AP (1996) Rural credit programs and women's empowerment in Bangladesh. *World Dev* 24(4):635–653
- Heise L, Ellsberg M, Gottemoeller M (1999) Ending violence against women. *Popul Rep* 27(4):1–1

- Henide K (2021) Assessing developing countries' sovereign creditworthiness: a female agency framework. <https://doi.org/10.2139/ssrn.3896641>
- Henke H, Kaufmann H, Messow P, Fang-Klingler J (2020) Factor investing in credit. *J Index Invest* 11(1):33–51
- High-Pippert A, Comer J (1998) Female empowerment: the influence of women representing women. *Women Politics* 19(4):53–66
- Hoddinott J, Haddad L (1995) Does female income share influence household expenditures? Evidence from Côte d'Ivoire. *Oxford Bull Econ Stat* 57(1):77–96
- Houweling P, Van Zundert J (2017) Factor investing in the corporate bond market. *Financ Anal J* 73(2):100–115
- Hyden G (1987) Debt: the development trap. *Afr Rep* 32(6):24
- Israel R, Palhares D, Richardson S (2018) Common factors in corporate bond returns. *J Invest Manag* 16(2):17–46
- Kabeer N (2001) Conflicts over credit: re-evaluating the empowerment potential of loans to women in rural Bangladesh. *World Dev* 29(1):63–84
- Kartha S, Athanasiou T, Caney S et al (2018) Cascading biases against poorer countries. *Nat Clim Chang* 8(5):348–349
- Krumbiegel K, Maertens M, Wollni M (2020) Can employment empower women? Female workers in the pineapple sector in Ghana. *J Rural Stud* 80:76–90
- Lakwo A (2006) Microfinance, rural livelihoods, and women's empowerment in Uganda (Doctoral Dissertation). Radboud University Nijmegen, Leiden, the Netherlands
- LeVine R, LeVine S, Schnell B (2001) "Improve the women": mass schooling, female literacy, and worldwide social change. *Harv Educ Rev* 71(1):1–51
- Mocan NH and Cannonier C (2012) Empowering women through education: evidence from Sierra Leone (No. w18016). National Bureau of Economic Research
- Orenstein MA (2008) Poverty, inequality, and democracy: post-communist welfare states. *J Democr* 19(4):80–94
- Osmani LNK (2007) A breakthrough in women's bargaining power: the impact of microcredit. *J Int Develop: J Develop Stud Assoc* 19(5):695–716
- Pitt MM, Khandker SR (1998) The impact of group-based credit programs on poor households in Bangladesh: does the gender of participants matter? *J Polit Econ* 106(5):958–996
- Pitt MM, Khandker SR, Chowdhury OH, Millimet DL (2003) Credit programs for the poor and the health status of children in rural Bangladesh. *Int Econ Rev* 44(1):87–118
- Pitt MM, Khandker SR, Cartwright J (2006) Empowering women with micro finance: evidence from Bangladesh. *Econ Dev Cult Change* 54(4):791–831
- Pitt M M, Khandker SR and World Bank, 1996. Household and intrahousehold impact of the Grameen Bank and similar targeted credit programs in Bangladesh. The World Bank
- Ravallion M, Heil M, Jalan J (2000) Carbon emissions and income inequality. *Oxf Econ Pap* 52(4):651–669
- Ross SA (1979) Disclosure regulation in financial markets: Implications of modern finance theory and signaling theory. *Issues Financ Regul* 5(1979):177–202
- Rubalcava L, Teruel G and Thomas D (2004) Spending, saving and public transfers paid to women. UCLA CCRP population working papers
- Sen A (1976) Real national income. *Rev Econ Stud* 43(1):19–39
- Sen G, Mukherjee A (2014) No empowerment without rights, no rights without politics: gender-equality, MDGs and the post-2015 development agenda. *J Human Develop Capabilities* 15(2–3):188–202
- Sinha N, Raju D and Morrison A (2007) Gender equality, poverty and economic growth. World Bank policy research working paper, (4349)
- Strauss J, Thomas D (1995) Human resources: empirical modelling of household and family decisions. *Handb Dev Econ* 3:1883–2023
- Swain RB, Wallentin FY (2009) Does microfinance empower women? Evidence from self-help groups in India. *Int Rev Appl Econ* 23(5):541–556
- Thomas D (1997) Incomes, expenditures, and health outcomes: evidence on intrahousehold resource allocation. *Intrahousehold resource allocation in developing countries*, pp.142–64.
- United Nations, 2015. United Nations sustainable development goals. United Nations
- UN women, 1995. Beijing declaration and platform for action. UN Women
- World Bank (2001) *Engendering development: Through gender equality in rights, resources, and voice*. Oxford University Press, New York

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