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Letter from the Editor

This is the first issue of the Ashoka University Economic Review in its new guise, as a journal of economics. It has been a long and tumultuous, yet rewarding and enlightening journey in the establishment of the journal. After various discussions with the Department of Economics, the AUER began its journey in its new guise. Without the feedback and support we received, this could not have been possible, and for that I would like to place on record my sincere appreciation and gratitude to the Economics faculty at Ashoka.

We are a small team that worked on this project, merely six of us. We may be called the editorial board, but the passion that we had to bring this idea to life led us to donning more hats than just that of assiduously reviewing submissions. What you see in the pages that follow is the result of the collective efforts of the editorial board: Aarushi, Saujanya, Tejaswini, Vaidehi, and Vivan. I would also like to thank the peer reviewers: Fiona, Sanju, and Sanskriti, for their involvement and help.

This issue has a fantastic selection of papers that the editorial board has identified from numerous submissions. The papers address evolving phenomena in the world of economics, while also analysing and grappling with relevant topics. Without revealing too much, I would say that the papers are riveting to say the least.

The Ashoka University Economic Review is an attempt to make economics research more accessible to not just students, but also authors. It is an attempt to intrigue not only those studying economics, but also those that deem themselves to be observers from afar. There has not previously been an attempt at Ashoka University to deliver accessible economics research to students, by students. I hope that with the publication of this issue, that changes.

While the journal evolves with time, I hope that it remains true to the ideas and principles with which it was born. I hope that the students of Ashoka University continue to contribute to us. I hope that this becomes a mainstay for years to come, and I hope that the research culture at Ashoka University continues to grow and thrive.

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ESG Bonds:
Reconciling Capitalism with Public Welfare in India

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Abstract

The aim of the paper is to build arguments for effective and efficient allocation of funds towards social welfare through the instrument of ESG bonds. ESG bonds are the perfect instrument to reconcile contrasting economic ideologies of capitalism and social welfare. As the paper addresses its growth on a global platform, there is an argument to ensure enhanced utilisation in India as well. As we establish the scope, potential and impact of ESG bonds, especially green and social bonds, it is also important to understand and mitigate investor apprehensions. These concerns highlight the leakages in the current structure of ESG bond financing in India. This leads us to investigate the current policy landscape of India, including regulatory and institutional hurdles, and consider improvements. The paper will conclude that India is at its prime to realise the transformative ability of ESG bonds to meet the finance requirements in different sectors. It can help India exploit the mechanisms of capitalism for the welfare of the country, which would be an invaluable opportunity arising out of the pandemic's shadows.

Keywords: Government Policy, ESG Bonds, Environment and Development.

JEL Classification: D61, R11, Q56, Q58

1. Introduction

Capitalism is construed to be at crossroads with social development. For centuries, it has signified exploitative economic growth with little to no regard to the environment, public welfare, or equitable social development. In a world that can no longer ignore holistic sustainable development, a market instrument has entered the landscape which seems to be the answer to reconcile these opposing economic philosophies.

The answer is Environment, Social and Governance (ESG) Bonds. These are fixed income instruments that either raise finance for sustainable projects or provide funds if ESG parameters have been achieved. These bonds are extremely versatile and are used for funding climate change and renewable energy projects (Green Bonds). Similarly, these bonds are also used to finance social development projects for achieving Sustainable Development Goals (Social Bonds).[1] What makes them unique is the capability of small developers to utilise the investment market for carrying out projects for the greater good of the public. The purpose of this paper is thus to illustrate the capacity of ESG bonds to utilise the market mechanism to address a crucial financing gap for large scale

[1] Garg, Shreyas, Rishabh Jain and Gagan Sidhu. 2021. Financing India's Energy Transition Through International Bond Markets. New Delhi: Council on Energy, Environment and Water.

development projects. This is especially true for developing countries, which struggle to meet fund requirements post the pandemic.

Beyond understanding what ESG bonds are, it is important to analyse how these instruments are already progressing in the global financial markets. JP Morgan expects the sale of ESG Bonds to sprint to $1 trillion by the end of 2021[2], an exponential rise from previous years. Firms worldwide are bidding heavily on utilising ESG Bonds to enhance their 'sustainability' image.

The paper aims to suggest that given the global scenario, Indian markets must boost their ESG Bonds issue. Almost $5 billion[3] has already been raised in the Indian markets through ESG Bonds, a figure that can be attributed to the global shift towards green investing arising as a result of the covid pandemic. However, there still lies untapped, under-utilised potential of ESG bonds which can be used for social development projects. India has seen few issuances of social bonds, such as those by the Pimpri Chinchwad Municipal Corporation and Shriram Transport Finance[4], but they are far from sufficient. One of the key concerns of the paper would thus be to map out the scope and impact of issuance of social bonds on public welfare.

While there is a surge in the Indian market for ESG Bonds, it is not free from investor reluctance. This acts as an impediment, preventing this instrument from reaching its true potential. Certain factors[5] for hesitation include the phenomenon of greenwashing - which implies false representation of issuer's projects as environment friendly to rope in funds; limited availability of quality data on environment performance; high degree of variance in calculating the ESG scores due to lack of standardisation in reporting methodologies. An additional challenge posed is the lack of globally accepted standards and definitions. Asset managers often carry out investment decisions under the pretext of 'ESG norms' without accurate understanding of the instrument. An unlikely reluctance arises due to the moral conscience of KPI-based ESG Bond investors, who seek to gain in a situation when companies fail to meet their social/sustainability commitments.

The propensity of manipulation in the issue of ESG bonds, therefore, poses concerns for Indian investors. There exists an extreme lack of resources to invest in mitigating these concerns.

[2] Mutua, D. 2021. *ESG Bond Sales Sprint to $1 Trillion as Investors Force Change*. Bloomberg.com.
[3] Dhanjal, S. 2021. Indian firms warm up to ESG bonds in capital-raising plans. Mint.
[4] Garg, Shreyas, Rishabh Jain and Gagan Sidhu. 2021. Financing India's Energy Transition Through International Bond Markets. New Delhi: Council on Energy, Environment and Water.
[5] Yesbank.In, 2019."ESG Investing Scenario In India",

Investors continue to suffer from mental conditioning which perceives an unavoidable trade-off between financial returns and ESG Performance thus inhibiting the growth of these instruments.[6]

The paper aims to address these concerns and suggest how it can enhance the participation of Indian investors. This is relevant given that the proportion of retail investors in the market, post the covid pandemic, has increased by an exponential 142 lakh in 2021[7] itself. This provides for a tremendous growth opportunity for the common citizen to invest in safe and sustainable credit instruments, providing a two-pronged benefit and empowering the society at large.

The financial institutions in India have recognized this economic opportunity and are actively involved in developing policies to regulate this sphere. India not only recognised the need for ESG Debt securities but also provided a framework for issuing and listing of the said securities in stock exchanges under the International Financial Services Centre region[8]. With an aim to increase ease of access to global capital and effectively mitigate the challenge that complexity poses; the Ministry of Finance provides for a unified framework under the IFSC Regulations 2021 which align with internationally recognised principles in this regard. The IFSCA Regulations recognise the importance of disclosure as a pillar in ESG Investing and hence provide for disclosure requirements to empower investors.[9]

However, the scope of these regulations remains limited to IFSC listed companies only. Therefore, policy recommendations concerning ESG Bond investing will be focused on efficient guidelines issued by these institutions to ensure secured investment decisions. In the further sections, section 2 will talk in detail about the various types of ESG Bonds; section 3 will address the global outlook of ESG Bonds; section 4 will elaborate on ESG bonds' growth trajectory in India; Section 5 will deal with policy and regulatory frameworks surrounding ESG; Finally, section 6 and 7 will provide recommendations and concluding remarks on the future of ESG Bonds in India.

[6] OECD 2020, OECD Business and Finance Outlook 2020: Sustainable and Resilient Finance, OECD Publishing, Paris, https://doi.org/10.1787/eb61fd29-en.
[7] Livemint, 2021 *Why more and more individual investors in India are investing in stock market*.
[8] Vinod Kothari Consultants 2021 "Moving towards sustainable finance through sustainable bonds"
[9] Ibid.

2. Understanding ESG Bonds

The concept of Environmental, Social and Governance (ESG) Investing has emerged for the financial institutions to accept additional social responsibility. For the purposes of this paper, we focus on a particular segment of ESG investing - the issue of ESG Bonds.

ESG Bonds are essentially fixed income instruments which integrate ESG objectives to traditional bonds in order to raise funds for developmental projects. The financial markets have sufficiently developed versatile instruments within this broad category. ESG bonds can either be project-linked or Key Performance Indicator (KPI) linked. Project-linked bonds provide funds for specific ESG oriented projects. These could either be environmental projects (Green Bonds), social development projects (Social Bonds) or a mix of both (Sustainability Bonds). Apart from project-linked bonds, there exist KPI-linked bonds which reward firms on the basis of their ability to meet certain ESG parameter targets over a given period of time.[10] Each classification of ESG bonds serves a unique purpose and helps maximise the utility derived from the issue of such an instrument.

As we attempt to elaborate on the rise and scope of ESG bonds, it becomes pertinent to understand why organisations globally are actively choosing to raise ESG bonds. It allows organisations to demonstrate a greater social standing, public accountability while engaging in sustainability practises at an institutional level. ESG Bonds are the most balanced instrument to respond to the societal pressure of corporate social responsibility. Beyond the boost in public image, an ESG-oriented corporate bond portfolio increases financial opportunities for organisations and permits diversification of exposure. ESG focused corporate entities have started to generate more profits as compared to their counterparts[11]. An ESG investment focused portfolio emphasises on the triple bottom line approach - combining financial profits with concern for the people and the planet.

2.1 Green Bonds

Green Bonds are a form of 'use of proceeds' bonds wherein the funds raised through their issue are used to finance green investments and projects that are committed to address climate change.[12] Therefore, the usage of funds is the sole differentiator of green bonds from normal 'vanilla' bonds. Now, in order to define which projects can be classified to be 'green' for the purpose of issue of this bond, the international Climate Bond Initiative (CBI) has provided the financial markets with

[10] Garg, Shreyas, Rishabh Jain and Gagan Sidhu. 2021. Financing India's Energy Transition Through International Bond Markets. New Delhi: Council on Energy, Environment and Water.
[11] Blank, H., Sgambati, G., & Truelson, Z. 2016 "Best Practices in ESG Investing." *The Journal Of Investing*, *25*(2), 103-112. https://doi.org/10.3905/joi.2016.25.2.103
[12] Climate Bonds Initiative 2021"Explaining Green Bonds".

Green Bond Principles (GBPs). The GBPs is endorsed by the financial actors through the International Capital Markets Association (ICMA). The GBPs consider the following projects permitted to be financed by Green Bonds: renewable energy, energy and resource efficiency, pollution reduction, water and waste management, conservation, and climate adaptation[13].

In 2021, over $370 billion worth of Green bonds have already been issued as per CBI. The World Bank had issued the first green bond in 2008[14]. Since then, it has issued approximately USD 16 billion equivalent in Green Bonds through over 185 bonds in 23 currencies. Up to date, the cumulative amount of Green Bonds issued globally is approximately $1.458 trillion USD.[15]

2.2 Social Bonds

Social bonds play a key role in the financial markets to address global social development challenges by raising funds for new and existing projects. These projects can either revolve around addressing or mitigating a specific social issue and achieve a positive social outcome.

Similar to how Green Bonds are regulated and classified keeping in mind the GBPs, the Social Bond Principles (SBP) provided by the ICMA provide guidelines for transparency, disclosure and reporting. The SBP plays a significant role in tracking the utilisation of funds while providing insights into the intended social impact. In certain occasions, it may be possible that social projects include additional environmental benefits, in which case the bond is classified on the basis of the primary objective of the underlying projects. Issues covered under SBP include healthcare, education, housing, food security, and empowerment.[16]

Social Bonds have increased this year due to its relevance in addressing the coronavirus pandemic. It was extremely helpful in raising funds for healthcare research and investment, particularly in terms of vaccine development. CBI reported social bonds made up approximately $20 billion or around 5% of sustainability bonds issued in 2019[17]. Morgan Stanley reported the issue of $32 billion dollars of social and sustainability bonds in April 2020 alone.

2.3 Sustainability Bonds

These bond instruments allow the raised proceeds to be applied to fund a combination of Social and Green projects. The Sustainability Bond Principles are a combination of the core

[13] Icmagroup.Org. 2021 “Green Bond Principles » ICMA - International Capital Market Association".
[14] World Bank, 2021 “Green Bonds - Treasury World Bank”
[15] Climate Bonds Initiative 2021, *Climate Bonds Initiative*.
[16] *ICMA* 2021, *The International Capital Market Association*
[17] *Climate Bonds Initiative*. Climate Bonds Initiative. (2021).

components of both the SBPs and the GBPs. A Sustainability bond is also often linked with projects committed towards achieving the Sustainable Development Goals (SDGs).

2.4 KPI-Linked Bonds

Key Performance Indicator linked bonds are referred to as Sustainability-linked Bonds (SLBS). While the other three bonds were 'use of proceeds' based instruments, these bond instruments are contingent upon the issuer achieving predefined ESG parameters. Funds are provided in expectation of future improvement in sustainability outcomes within a given timeline. The issue of SLBs relies largely on building accountability from the issuer and strict monitoring of ESG performance indicators. In case the issuer fails to meet the pre-set targets, the firm is forced to make additional payments to the investors, thereby providing incentive to deliver results.[18]

Specific targets like reducing carbon emissions over the next 10 years would fall under the ambit of SLBs. They are a recent phenomenon in comparison to Green Bonds and Social Bonds. However, they are already projected to grow to as much as $150 billion in 2021.[19]

The existence of a specific set of principles for the different types of Bonds ensures clear definition classification in the international bond markets, along with providing mechanisms for project evaluation, selection and reporting of results. However, while these principles exist, policies and regulations differ greatly between countries and financial markets.

The rise of ESG Bonds is significantly filling the gap with respect to sustainable finance. International organisations have now been created that supplement this process and ensure that these instruments are used in the most optimum and widespread manner possible. Some of the renowned organisations working towards its advancement include but are not limited to United Nations Principles for Responsible Investment and the Financial Stability Board's Task Force on Climate-related Financial Disclosures and the European Commission's ongoing Action Plan on Sustainable Finance, with a strong focus on expanding access to and creation of sustainable-finance products.[20]

[18] *ICMA* 2021, *The International Capital Market Association* "Sustainability-Linked-Bond-Principles"

[19] Ranasinghe, D, 2021 *Sustainability-linked bond market to swell up to $150 billion: JPMorgan ESG DCM head*. U.S.

[20] United Nations, Inter-agency Task Force on Financing for Development, Financing for Sustainable Development Report 2021, New York: United Nations

3. Global Scope for ESG Bonds

ESG Bonds issuance began way back in the late 2000s and was primarily centred around the issue of green bonds concentrated in the US and Europe. The growth of these bonds was facilitated by the adoption of Sustainable Development Goals by the UN as well as the adoption of the Paris Agreement by 195 countries in 2015. Today, the Global issuance of ESG bonds is expected to double compared to 2020 and hit an all-time high of $1 trillion by the end of 2021, as per a Bloomberg report.[21] Moody's Investors Service predicts a 59% jump in the issuance of sustainable bonds (green, social and sustainable bonds) hitting the $850 billion mark in 2021.[22] With new issuance of ESG Bonds as of September, already touching $750 billion (as compared to a total issue of only $468 billion in 2020)[23], the global markets are reflecting an emerging trend toward sustainable investing which experts attribute to the rapid evolution in data availability and ESG Reporting.

The onset of the global COVID-19 pandemic has elevated the concept of ESG from merely a buzzword to an urgent practice that needs to be adopted by corporations worldwide. It accelerated the realisation amidst investors and firms worldwide to recognize how business practises cannot overlook environmental and societal concerns.

The pandemic exposed the crumbling social support systems worldwide which failed the most marginalised and disadvantaged sections of society at their time of need. This led to global markets witnessing proliferation of social bonds in 2020. The global issuance of social bonds tripled, reaching $240 billion at a time when the entire world was reeling under the effects of a global pandemic.[24] As per experts, countries in Europe and Latin America that present immense opportunity for positive social impact, reflect the most potential for increased issue of social bonds specially by the public sector.

Despite a massive surge in the issuance of Social Bonds necessitated by the pandemic, green bonds continue to be the driver in the ESG Bonds market making up nearly half of the total ESG Debt in 2020. Many attribute this to how green bonds are older, more recognized instruments with better regulation and information to supplement investment decisions. Moody's expects the global issue of green bonds to jump to $450 billion in 2021 as compared to $300 billion last year. [25]

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[21] Mutua, D. 2021 *ESG Bond Sales Sprint to $1 Trillion as Investors Force Change*. Bloomberg.com.
[22] Dhanjal, Swaraj. 2021. "Indian firms warm up to ESG bonds in capital-raising plans". *mint*.
[23] Quinson, Tim. 2021. "Banks Are Really Cashing In on ESG Bonds". *BloombergQuint*.
[24] *Environmental-finance.com* 2021"Driving ESG bond markets to new heights - Environmental Finance".
[25] *Nasdaq* 2021 "As ESG Bond Market Matures, Green Premium Begins To Fade".

In the global market for ESG Bonds, the issue of the nascent Sustainability Linked Bonds (SLBs) has also been witnessing a surge. Since its inception in 2019, SLB issuance has been nearly $20 Billion with year-to-date volumes about $6.9 billion. These bonds are not earmarked for specific projects and hence render flexibility to the firms to use it for raising funds for generic corporate purposes, while at the same time imposing a fine in the form of a coupon step up in the event of failure to meet sustainability targets. “This flexibility allows a broader universe of issuers to obtain sustainable financing, such as those that may not have enough green or social capital expenditure to issue a sustainable use-of-proceeds bond or that lack the capacity to effectively track or report practices required for such instruments” said Lori Shapiro[26], an associate in S&P Global Ratings' sustainable finance team. Marilyn Ceci, global head of ESG developed capital markets (DCM) at JP Morgan as well as the co-author of Green Bond Principles has predicted a 20-fold growth for SLBs this year, touching anywhere between $120 billion and $150 billion.[27] The growth in SLBs is also propelled by clarity in rules around what they actually are.

Thus in the backdrop of recovering from a pandemic that disrupted the lives and livelihoods of countless people worldwide, nations across the world are turning to ESG Bonds with the long overdue realisation that business, society and the environment are inseparable.

4. Indian Scope of ESG Bonds

India has ambitious targets when it comes to environmental and social parameters. The government has set a target of 450GW of installed renewable energy capacity by 2030, along with developmental policies meant for social welfare.[28] The issue arises in terms of receiving requisite financing for these projects and this is where ESG Bonds become relevant in the Indian context.

ESG issue is gaining momentum in the Indian markets, with over $7 billion bond sales in 2021.

It is estimated that ESG related inflows have increased by 76% in 2021. Moreover, the stock indices are increasingly incorporating ESG aspects with the creation of the NIFTY ESG 100. It is even more exciting to see that the NIFTY ESG 100 index has systematically surpassed the NIFTY 100 for

[26] Spglobal.com, 2021Sustainability-linked bonds in 'rapid growth' as more firms tap ESG debt market.

[27] *The Economic Times*. 2021, "Sustainability-linked bond market to swell up to $150 bn: JPMorgan".

[28] Garg, Shreyas, Rishabh Jain and Gagan Sidhu. 2021. Financing India’s Energy Transition Through International Bond Markets. New Delhi: Council on Energy, Environment and Water.

standard bond issue in the last few years.[29] The positive future expectations of ESG Bonds is further reflected in the rapid rise in issuance of Green Bonds as a component of India's ESG portfolio. Approximately over $5 billion worth of Green Bonds will mature by 2024.[30]

The distribution of issuers is extremely versatile, including both private organisations as well as government agencies raising funds for the purposes of carrying out developmental projects. Hero Future Energies raised climate bonds certified green bonds worth $3 billion climate bonds certified green bonds for wind projects. JSW Hydro Energy, India Green Power Holdings, ReNew Power Ventures, Greenko and Adani Green Energy are also amongst giant green energy organisations which have raised green bonds.[31]India has seen issuance of Social Bonds by the Pimpri Chinchwad Municipal Corporation while Shriram Transport Finance issued an ESG bond worth $250 million. India's first sustainability linked bond was issued by Ultratech Cement Ltd. Additionally, Adani Electricity Mumbai is considering a $300 million 10 year SLB. The KPI-linked to the bond will encourage the firm to source at least 60% power from renewable sources of energy. [32]

In the last few years, firms have made significant progress in terms of understanding the ESG requirements and modifying their accounting processes to fit guidelines better. There is a paradigm shift in the composition of institutional investments, especially through increased issuance of ESG Bonds in India. This also comes at a time wherein retail investors in the financial markets are increasing at an exponential rate. In the pandemic year, an SBI report quoted a rise of a whopping 142 lakh individual investors during fiscal year 2021. The turnover share of individual investors in the stock exchange has also increased to 45% according to NSE data.[33]

Therefore, the time is ripe for India to meet its financing gap for developmental projects through a boost in ESG bond issue and utilise the rise in retail investors in the market looking for stable, fixed and meaningful sources for investing their savings.

5. Understanding Investor Sentiments

The growth in popularity of ESG Bonds lies in the shifting investor sentiment to diversify their portfolio and invest into projects that are socially responsible. This sentiment is widely shared

[29] Jethmalani, Harsha. 2021. "Nifty ESG Beats Nifty50 In Last One Year As Indians Take To Conscious Investing". Mint.
[30] Garg, Shreyas, Rishabh Jain and Gagan Sidhu. 2021. Financing India's Energy Transition Through International Bond Markets. New Delhi: Council on Energy, Environment and Water
[31] Garg, Shreyas, Rishabh Jain and Gagan Sidhu. 2021. Financing India's Energy Transition Through International Bond Markets. New Delhi: Council on Energy, Environment and Water
[32] Ibid.
[33] Saxena, R. 2021 "India Firms Raise Over $4 Billion In Sustainable Bonds Overseas In 2021" BloombergQuint.

amongst retail investors. Retail investors are increasingly active in the global financial markets, especially in India. These investors are actively looking to invest in stable portfolios, however, might refrain from financing ESG Bonds due to various uncertainties surrounding it.

Investor scrutiny in terms of understanding the scope and long term impact of ESG Bond-funded projects is one of the key reasons for reluctance. A company's ESG performance is typically reported through metrics such as sustainable product differentiation, utilisation of raw material, waste generated etc. However, the transparency of these reports is a problem. In most countries, the metrics for evaluating ESG performance parameters is not uniformly accepted, which restricts investors from purchasing foreign based ESG Bonds. Therefore, both the lack of quality data for assessment as well as inconsistent measurement mechanism contributes to investor reluctance. Another key challenge restricting investor confidence is with respect to the phenomenon of 'Greenwashing'. This refers to advertisement or portrayal of projects to be sustainable in nature without the usage of funds for the purposes mentioned at the time of issuance of bonds. These projects are merely categorised to be 'Green' during audit procedures without any ex-post monitoring of whether the funds have been utilised for the aforementioned project or not. Lack of monitoring for the purpose of verification of funds therefore continues to weaken investor sentiment towards ESG bond investments. [34]

Finally, above all, the traditional mindset of the investors about the dichotomy of profit making and achievement of sustainable objectives. It is assumed that ESG integration will come with a cost. This restricts the future vision of investors and forces them to merely focus on short-term profit maximisation without consideration of long term sustained growth.

6. Policy and Regulatory Framework

The ESG Bond market in general and green bonds in particular hold immense potential globally and thus mandate structured regulations to ensure that this potential is adequately tapped. At the global level, the Green Bond Principles (GBP) rolled out by the International Capital Market Association (ICMA) act as a set of voluntary process guidelines which recommend the creation of a framework for issuance of green bonds with an aim to overcome lack of transparency.[35] India as well as countries across the globe draw their guidelines, guided by and within the ambit of these principles. Similarly, the Climate Bonds Initiative, a non-profit organisation has aimed to foster investments aligned with addressing climate change by

[34] Bhavnani, C., & Sharma, A. 2019. *ESG Investing Scenario in India* (Responsible Banking, YES BANK).
[35] *Vinodkothari.com*. 2021 "Moving towards sustainable finance through sustainable bonds – Vinod Kothari Consultants".

commencing a voluntary standards and certification scheme.[36] It serves to boost investor confidence as it certifies the particular bonds as compliant with industry standards, thus also reducing the due diligence cost for lenders as an added benefit.

Recognising the true potential of this market, Indian policies over the years have also evolved to facilitate the creation of a conducive environment that fosters the growth of ESG Bonds by building a transparent system through various disclosure and reporting regulations and mandates. Acts and Regulations like the Companies Act, 2013 have become cognisant of the need to mandate companies and firms to adopt corporate social responsibility through ESG.

With an aim to provide a framework for issuance and listing of ESG Debt Securities, the Ministry of Finance unveiled the International Financial Service Centre Authority (Issuance and Listing of Securities) Regulations 2021 or the IFSC Regulations. This framework has been formulated with the primary intention of facilitating ease of access to global capital as well as reducing complexity by streamlining the regulatory requirements.[37] The set of guidelines it encompasses are in line with globally recognised principles formulated for such instruments. It categorically lists what encompasses as Green Bonds by definition within the broad framework laid by ICMA's GBP.

Additionally, recognising how disclosure is the main pillar of ESG investing, it lists certain disclosure requirements, originally stated in the Sustainability-linked bond principles of ICMA. These regulations list ESG Bond specific requirements under Chapter X, however their scope remains limited to IFSC-listed companies only. Even though guidance can be sought by companies in India outside the purview of IFSC Regulations, still this lack of coverage of such companies acts as an impediment in the market for ESG Bonds.

Another important facet of ESG is the need for standardised reporting and in line with that in May 2021, SEBI launched the Business Responsibility and Sustainability Reporting (BRSR) format which replaced the erstwhile Business Responsibility Reporting (BRR) regime, mandatorily applicable to the top 1000 listed entities (by market capitalisation) from FY 22-23.[38] This is a welcome step as it requires companies to evaluate their own ESG risks and opportunities which will aid in the disclosure of the financial repercussions as well as the plan of action to

[36] "Climate Bonds Initiative". 2021. *Climate Bonds Initiative*
[37] *Vinodkothari.com*. 2021 "Moving towards sustainable finance through sustainable bonds – Vinod Kothari Consultants".
[38] *KPMG* 2021 "The dust around ESG is finally settling".

mitigate such risks. Moreover, by compelling firms to disclose certain ESG Metrics, it not only facilitates standardisation but also makes investor decisions easier by improving comparability.

Green Bonds continue to dominate the Indian markets as the most legally recognised and popularly adopted mode of sustainable finance. The issuance of Green Bonds is governed by regulations rolled out by the Securities and Exchange Board of India. Apart from the general guidelines under the SEBI (Issue and Listing of Debt Securities) Regulations, 2008, more recently, on May 30, 2017 it issued additional "Disclosure Requirements for Issuance and Listing of Green Debt Securities" which is seen as a positive step towards bringing about transparency. [39]

The Indian ESG Bond market especially post COVID-19 is presenting a very lucrative opportunity that stems out of ensuring welfare for all stakeholders. However, due to a lack of adequate regulation especially when it comes to social bonds and SLBs, there is investor reluctance. The Government of India and SEBI should work together to formulate policies and frameworks for such classes of bonds within ESG Bonds in order to address regulatory uncertainties. Secondly, they should set up some mechanism to include all companies under the ambit of IFSC Regulations 2021 in order to ensure there is uniformity in applicability of disclosure requirements.

Finally, the regulatory framework must ensure that definitional challenges surrounding ESG Bonds are completely mitigated. In the process of carrying out these policy changes and implementing recommendations, it will be of utmost importance to ensure simplicity in the policies while remaining comprehensive in the scope, ambit and application of regulatory frameworks for ESG Bond issue in India.

7. Conclusion

This paper carried out an elaborate literature review of the need of environmental, social and governance bonds in reconciling the contrasting ideals of capitalism and free markets with public welfare and environmental protection. The framework and principles guiding different types of ESG Bonds are equipped to ensure adherence and when utilised optimally, can lead to a tangible improvement in the conduct of businesses worldwide. The triple bottom approach philosophy of People, Profits and Planet is strengthened by such a financial instrument which is increasingly finding

[39] Ibid.

acceptance globally and in India. Corporations have strong incentives to abide by ESG parameters and deliver results through financing meaningful projects using ESG Bonds.

Additionally, individual investors find themselves benefitting from the expansion of ESG Bonds as a stable fixed income source of investment. Investor reluctance in the form of lack of uniform ESG parameters and monitoring mechanisms is valid and must be addressed by the international communities, as well as on a national level by financial institutions. In the Indian context, ESG Bonds in the form of Green Bonds have gained popularity while social and sustainability bonds are newly emerging. An analysis of the policy and regulatory framework emphasises that considerable progress and comprehensive policy making is underway to ensure a smooth growth trajectory of ESG Bonds in the country. However, there is always scope for refining complexities while safeguarding the interests of investors. To conclude, ESG Bonds are the answer to achieve sustainable development with rapid economic growth in the 21st century and policy makers across the world must realise its potential and seek to maximise the utility derived from an almost perfect financial instrument.

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Human Capital Formation, Brain-Drain and Economic Growth: A Theoretical Analysis

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Abstract

The paper attempts to analyse the role of foreign capital inflow (FDI) and domestic fiscal policy in terms of proportional taxation to determine human capital formation(or skill acquisition) and brain drain in a developing economy. We extend the basic analysis to the long-run dynamics of human capital formation to compare the efficiency of lump-sum income taxation against proportional income taxation in skill formation. In the paper, we build a three sector, three-factor general equilibrium model that is a hybrid of the Heckscher-Ohlin structure, Jones (1965, 1971) and Solow (1956).

Keywords: Brain-Drain, General Equilibrium, FDI Inflow, Human Capital Formation.

JEL Classification: B13, D5, F2, H2, J6, O10.

1. Introduction

One of the most pressing questions, economics attempts to answer is why several nations are rich while others are poor. Economic theory mainly suggests that the differences between the education levels of the population are a crucial part of the answer, and improved schooling opportunities should raise incomes in developing countries[1]. highly educated workers in many developing countries are scarce, a engineers, physicians, and professionals from the same countries settle in Canada, the USA, and Western Europe[2]. This phenomenon is called “Brain Drain”. Brain drain refers to the migration of skilled human resources for trade, education, better standards of living, higher salaries and access to more advanced technology[3]. This is of growing concern worldwide because of its impact on the economic and social structures of developing countries. This translates to a considerable loss of resources for the same, while the benefits accrue to the recipient states who haven't spent on their education.

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[1] Human capital is the intangible economic value of a worker's experience and skills. This includes factors like education, training, intelligence, skills, health, and other things employers value such as loyalty and punctuality.

[2]United Nations, Department of Economic and Social Affairs. Report on International Migration. New York, NY: UN Headquarters, 2019. https://www.un.org/en/development/desa/population/migration/publications/migrationreport/docs/InternationalMigration2019_Report.pdf.

[3] Docquier, Frédéric. 2014. “The brain drain from developing countries.” IZA World of Labor. https://wol.iza.org/articles/brain-drain-from-developing-countries/long

The intellectuals of a country are one of their key resources as they constitute the human resource of that country. For the past five decades, international migration has significantly increased. The number of migrants has increased from 75 million in 1960 to approximately 215.8 million in 2010. UN Economic Organization for Migration data estimates that 27,000 skilled Africans left their continent for industrialized countries between 1960 and 1975. Between 1975 and 1984, the number went up to 40,000[4]. Furthermore, Africa lost 60,000 professionals including doctors, university lecturers and engineers during 1985-1990 to migration. UNESCO's figures state that a minimum of 20,000 qualified people were estimated to have left the continents per annum. [5]Besides just African countries, human capital flight also affects Latin America and the Caribbean. Almost 80 percent of school graduates from Haiti, Belize, Grenada and Guyana are currently living in the USA. Moreover, approximately 30 percent of the labour force from El Salvador, Guatemala, Honduras, Nicaragua and Panama work in the USA. For the last 30 years, Asia has also been facing an enormous drain of skilled labour, executives, technicians, and other highly skilled personnel to well-paid jobs in developed countries.

On the supply-side, differences and opportunities arising from world globalisation have motivated skilled workers to migrate to where jobs are abundant. Meanwhile, on the demand-side, favourable immigration policies and better economic prospects, as in most OECD countries, have motivated highly skilled migrants from less-developing countries to move abroad (ILO, 2006[6]). These are the main reasons for migration of highly skilled labour, particularly from developing to developed countries.

Social environments are usually considered to be a key reason for brain drain. In source countries, lack of employment opportunities, political uncertainty, economic recession, health factors and "other push' factors" contribute to the migration of skilled labour, whereas host countries usually offer rich opportunities and political stability. A

[4] Schöfberger, Irene. 2021. "Migration data in Western Africa | Migration data portal." Migration Data Portal. https://www.migrationdataportal.org/regional-data-overview/western-africa.

[5] United Nations. 2018. "Global education monitoring report, 2019: Migration, displacement and education: building bridges, not walls."https://unesdoc.unesco.org/ark:/48223/pf0000265866.

[6] Popova, Natalia, and Mustafa H. Özel. 2018. *ILO Global Estimates on International Migrant Workers: Results and Methodology*. N.p.: International Labour Office

developed economy and better living conditions (are some of the pull factors) that attract talent.

The recipient countries gain from the inflow of the skilled workforce while the source countries suffer a loss of human capital, the net effect on the world economic welfare remains unclear. In many cases, the country is not only losing its investment in the education of health professionals, but also the contribution of those workers to the health care sector. For example, India has a doctor-population ratio of about 0.62:1000 compared to the USA which has 2.554:1000[7].

Economic growth is a crucial indicator of an increase in the standard of living and the welfare level in a country. In traditional growth models, the resources which augment economic growth are physical capital, human capital, labour and natural resources. To achieve the best economic outcomes in the long term, it is essential to have fit, educated and productive labour. Productive human capital also helps in reducing inequality. The more productive human capital is, the less is the inequality as it involves skill acquisition by unskilled workers who can then shift from the informal sector to the formal sector. In today's modern world of information education plays a critical role. Higher education boosts a country's capabilities for participation in an increasingly knowledge-based world economy and can consequently stimulate economic growth and reduce the poverty rate. Thus, higher education has assumed great significance for developing countries, especially for countries like India experiencing services-led growth. The United Nations Department of Economic and Social Affairs, Population Division 2020, International Migration Data [8]highlights that India has the highest transnational population as of 2020 at 18 million rising from about 7-8 million in 2000.

With the progress of economic liberalization and globalization, the role of the service sector grows more and more predominant, which exacerbates the problem of the shortage of skilled labour. As a result of this, the national skill development mission was introduced by

[7]Jankharia, Bhavin. 2022. "We don't even know how many doctors currently practice in India." Times of India.
https://timesofindia.indiatimes.com/blogs/voices/we-dont-even-know-how-many-doctors-currently-practice-in-india
[8]United Nation. n.d. "Population Division | Department of Economic and Social Affairs." United Nations Population Division | Department of Economic and Social Affairs. Accessed January 12, 2022.https://www.un.org/en/development/desa/population/migration/data/estimates2/estimates19.asp.

the government of India wherein policymakers have been working intensively to mitigate this skill deficit.

Human capital accumulation[9] also plays an important role in endogenous economic growth and is a crucial input of any economy. Therefore, an increase in the endowment of skilled labour in a country can be directly related to its economic growth even considering that we can't always comment on the country's economic development.

2. Literature Review

The relationship between economic growth and human capital formation has been of interest to theorists. Chaudhuri and Yabuuchi (2009) show the effect of foreign capital inflow in the form of infrastructure development on the education sector in a developing economy. They briefly analyse the process of skill formation and the relative earnings of workers in distinct categories. They conclude that foreign capital inflows and provision of infrastructure development funds promote skill formation and help expand the high-skilled sector.

Kar and Marjit (2005) analyse the effect of emigration on a pre-existing skilled-unskilled wage gap in the context of a small developing economy. They conclude that emigration of unskilled labour leads to deterioration of this pre-existing wage gap whereas emigration of skilled labour leads to improvement of the wage gap.

Beladi, Chaudhuri and Yabuuchi (2008) use a two-sector dual economy structure with an unskilled sector and a skilled sector and three-factor Heckscher-Ohlin (H-O) general equilibrium to show the effects of an inflow of foreign capital, foreign unskilled labour and foreign skilled labour on the skilled-unskilled wage inequality in a developing economy. The paper ultimately concludes that the skilled-unskilled wage inequality depends on the factor intensities of the sectors. The paper however includes the Harris-Todaro type of economy with unemployment.

Gupta and Dutta (2010), on the other hand use a different approach involving non-traded and traded sectors and hence analyse its effect on the skilled-unskilled wage inequality. The non-traded sector includes education, health and legal service sectors whose outputs cannot be traded. This sector uses skilled labour in the form of teachers, doctors and

[9] It can be simply defined as the increase in the number of people who possess skills, have education and experience which are critical for the economic growth and development of a country.

legal practitioners respectively. The paper concludes that wage inequality depends upon the 'factor intensity rankings' of both the non-traded and traded sectors.

The model uses the H-O general equilibrium structure with three sectors and four factors of production. Sector one or the agricultural sector uses unskilled labour and capital, sector two or the uses skilled labour and capital while sector three uses skilled labour and land. Sector one and the agricultural sector produce traded goods, whereas sector two produces non-traded final goods. The paper highlights some important propositions regarding the skilled-unskilled wage inequality in all of which given the 'factor intensity' of the traded and non-traded sectors it is shown how exogenous changes like skill acquisition, changes in labour endowment, changes in capital stock and also the price of traded goods play an important role in deciding the skilled-unskilled wage gap.

A detailed analysis of non-traded goods and the nature of capital mobility between the traded and the non-traded sectors and the consequences of liberalized investment policies on the relative wage inequality in the developing countries have been shown in Yabuuchi and Chaudhuri (2007). An interesting finding in their paper is that the inflow of foreign capital improves the wage inequality when the low-skilled sector is capital-intensive. However, they have not taken into consideration the endogenous formation of human capital. The transformation of the unskilled into skilled labour in the above-mentioned literature has been instantaneous. However, Gupta and Dutta (2018) endogenize the formation of skilled labour in the long run. They have used the Ramsey framework of consumption savings allocation to analyse the growth in the economy through capital accumulation and the transformation of unskilled labour into skilled labour. This differs from our paper as we make use of the Solow framework of endogenizing the domestic capital endowment and skilled labour endowment. Jones (1965) has been used as the foundation for our general equilibrium model.

By taking into account the Heckscher–Ohlin framework and considering the manufacturing sector as a capital-intensive sector and the agricultural sector as a labour-intensive sector, we have viewed the manufacturing sector as an import-competing sector and the agricultural and skilled sector as the export-competing sector. The analysis has been made in a general equilibrium framework. In a typical developing country, as is portrayed in our paper, there always remains the problem of scarcity of both capital and skilled labour. Therefore, an inflow of Foreign Direct Investments (FDI) and an expansion of the skilled sector would to some extent act as a measure of economic growth from the perspective of

these developing countries. Another problem highlighted in our paper is that if there is emigration of skilled labour from the home country to the foreign country, (a skilled labour outflow), there will be a reduction of skilled labour endowment in the home country resulting in lower human capital formation thereby impacting economic growth.

3. Methodology of Study

We use the multi-sectoral general equilibrium model based on the Heckscher-Ohlin structure with the assumption of standard neoclassical theory.

First, we build a short-run model with two-production sectors and one education sector. There are three factors of production: unskilled labour, skilled labour and capital. The role of the government is to maintain a balanced fiscal budget commodity and markets are assumed to be competitive. Finally, we extend the basic model to the long run by allowing for human-capital formation. Thus, the Long-Run model is a hybrid of the H-O and Solow (1956) growth model. 'Hat calculus' has been used to determine the relative changes in the equilibrium values of the variables owing to variation in fiscal and foreign policy parameters.

4. The Model

4.1 Assumptions and Description of the Economy:

We consider a short-run three-sector, three-factor general equilibrium model with fixed factor coefficient technology. The stylized economy consists of the following sectors. There is (1) a primary informal sector (2) a formal sector and the public education sector (E). The informal sector uses unskilled labour and capital (K) as factors of production. The formal sector and the public education sector both use skilled labour (S) and capital (K) as factors of production. Here, the skilled labour in the education sector (E) refer to teachers, professors, etc. The capital refers to the various educational institutions such as schools, colleges, etc.

Unskilled labour is also used in the formal sector. The output produced by the informal sector is given by X_1, the output produced by the formal sector is given by X_2,and the output produced by the public education sector is given by X. Here, the output of the education sector (E) refers to the students passing out from the institution, the increase in research and development. The unionised formal manufacturing wage ($\overline{W}$) is exogenously given and is greater than the flexible informal rural unskilled wage (W).

We assume the informal sector is relatively labour intensive as compared to the formal sector, which is relatively capital intensive. In other words, this means that the capital-

labour ratio (K/L) is lower for the commodity produced in the informal sector (X_1) than the commodity produced in the formal sector (X_2), that is,

$\frac{a_{L1}}{a_{K1}} > \frac{a_{L2}}{a_{K2}}$, where a_{Li} is the unskilled labour-output ratio in the *i-th* sector, i = 1, 2

a_{Ki} is the capital-output ratio in the *i-th* sector, i = 1, 2

There are constant returns to scale in the production of both commodities. Perfect competition exists in both commodities and factor markets. Capital is perfectly mobile across all the sectors. There is imperfect mobility of unskilled labour within the informal and formal sectors and perfect mobility of skilled labour within the formal and the public education sectors. The reason behind this is that an unskilled labour lacks the skills that would enable him to shift from the informal sector to the formal sector. For example, a farmer in the agricultural sector cannot immediately shift to a factory. Similarly, a skilled worker can move between the formal and education sectors with ease, thereby having perfect mobility.

The aggregate capital endowment is assumed to be the sum of domestic capital denoted by K_D and foreign capital which is fixed and is denoted by $\underline{K_F}$. Tastes and preferences are homogenous across the nations. The model assumes that a proportionate tax rate (τ) is imposed on the public education sector. Since, the cost of education is borne by the government. However, to finance this cost, the government levies a proportionate tax on the skilled labour in the education sector (E) to earn revenue and hence finance the cost. International trade is always balanced between nations. This is an extension of the Heckscher-Ohlin (H-O) model based on Jones (1965, 1971) framework.

4.2 Equational Structure (Short-Run Scenario)

$$Wa_{L1} + ra_{K1} = 1 \quad (1)$$

$$W_S a_{S2} + \bar{W} a_{L2} + ra_{K2} = P_2^* \quad (2)$$

$$W_S a_{SE} + ra_{KE} = C_E \quad (3)$$

$$X_E C_E = \tau \left(W_S (S - S^*)\right) \quad (4)$$

$$a_{L1} X_1 + a_{L2} X_2 = N - S \quad (5)$$

$$a_{K1} X_1 + a_{K2} X_2 + a_{KE} X_E = K_D + \overline{K_F} \quad (6)$$

$$a_{S2}X_2 + a_{SE}X_E = S - S^*(W_S^* - W_S) \quad (7)$$

$$Y = X_1 + P_2X_2 + C_EX_E \quad (8)$$

4.3 Working of the Model

We have 7 equations and 7 unknowns – W, W_S , r, C_E , X_1, X_2, X_E

Since $\overline{W}$ is fixed, from eq. (2) and eq. (3), we get W_S and r as a function of C_E

From eq. (1), we get W as a function of C_E

Now, substituting C_E in eq. (4), we get X_E as a function of C_E

Solving eq. (5), eq. (6) and eq. (7), we get the values for${X_1}^*$, ${X_2}^*$and ${C_E}^*$

Putting the value of ${C_E}^*$, we get W , W_S^* , r*, ${X_E}^*$

It is a decomposable structure because the factor prices are determined by the commodity prices alone and do not depend on the factor endowments.

5. Comparative statics

In the short run, we obtained the following three propositions.

5.1 FDI Inflow

Proposition 1: Increase in Foreign Direct Investment leads to higher fiscal expenditure on education, educational output (X_E) may fall. Also, an FDI inflow leads to a lower brain drain.

Explanation: An increase in Foreign Direct Investment ($\overline{K_F}$) leads to an increase in the total capital supply. There is an expansion of output in the formal sector (X_2) and contraction of output in the informal sector and public education sector (X_E) which follows directly from the Rybczynski Theorem[10]. Due to a contraction of the public education sector, to maintain a balanced budget, the per-unit cost of providing education (C_E) must rise in eqn. (4). As the cost of education rises, the skilled wage rate (W_S) rises and the rental rate of capital (r) falls, which follows directly from the Stolper-Samuelson Theorem[11]. Due to a fall

[10] Rybczynski theorem postulates that at constant commodity prices, an increase in the endowment of one factor will increase by a greater proportion the output of the commodity intensive in that factor and will reduce the output of the other commodity.

[11] Stolper-Samuelson theorem postulates that an increase in the relative price of a commodity (for example, as a result of a tariff) raises the return or earnings of the factor used intensively in the production of the commodity.

in *r*, the cost of production in sector 1 falls causing a rise in the demand for unskilled labour and a subsequent rise in the unskilled wage rate (*W*) in eqn. (1). An increase in W_S leads to a fall in the foreign skilled labour (*S**) from eqn. (7), resulting in a fall in brain drain.

5.2 Tax Rate

Proposition 2: An increase in the proportional tax rate in the short run, leads to an increase in the fiscal expenditure on education, a fall in brain drain, and an increase in the educational output (X_E). Now, if the increase in educational output dominates the increase in the tax rate, the fiscal expenditure on education falls, ultimately leading to a rise in brain drain.

Explanation: With an increase in the proportionate tax rate (τ), the per-unit cost of education (C_E) rises from eqn. (4), causing an expansion in the educational output (X_E), also the skilled wage rate (W_S) rises leading to a fall in the foreign skilled labour (*S**) from eqn. (7) and lowering of brain drain. However, if the rise in X_E dominates the rise in τ, then falls, as a result of which W_S falls and *r* increases which follow directly from the Stolper-Samuelson Theorem. Since$W_S$falls, there is an outflow of skilled labour from the home country to a foreign country from Eqn. (7). Hence, brain drain ultimately rises.

5.3 Lump-Sum Tax

Proposition 3: An increase in the lump-sum tax will lead to a rise in the skilled wage and hence a rise in the output of the education sector and hence a fall in emigration of skilled labour. But if the rise in the output of the skilled sector dominates then we see a fall decrease in the emigration of skilled labour.

Explanation: An increase in the lump-sum tax (*T*) will lead to a rise in the cost of education (C_E)(equation 3 of Short-run scenario), i.e., the cost of skilled labour or the skilled wage (W_S) will rise. This leads to a fall in the emigration of skilled labour from the home country (*S** falls), i.e., brain drain falls. This however leads to a rise in the output of the education sector (X_E rises). Now, if the rise in dominates the rise in, it will lead to a fall in W_S and the rate of return on capital (*r*) will fall which again follows from the Stolper-Samuelson Theorem as was in the case of proportional tax. But due to this fall in W_S, skilled labour will decrease at home and emigration rises again.

6. An extension: A Dynamic Long Run Equilibrium Model

We develop a dynamic long-run equilibrium model which is an extension of Solow (1956) in Jones type general equilibrium. The model assumes that the change in skilled labour overtime is equal to the output of the educational sector (X_E) net of the depreciation of skilled labour (human capital), where 'δ_1' is the constant depreciation rate.

Equation of motion of skill acquisition in the long run is as follows:

$$\dot{S} = X_E - \delta_1 S$$

In absence of population growth rate

i.e. $\frac{1}{N}\frac{dN}{dt} = 0$,

Long Run steady state:

$$\dot{S} = \frac{dS}{dt} = 0;$$

$$\Longrightarrow X_E = \delta_1 S \Longrightarrow S^* = \frac{X_E}{\delta_1}$$

$$\frac{d\dot{S}}{dS} = \frac{\partial X_E}{\partial S} - \delta_1$$

for steady state to be monotonically converging, $\frac{d\dot{S}}{dS} < 0$

$$\Longrightarrow \frac{\partial X_E}{\partial S} < \delta_1$$

$$If\ \tau \uparrow$$

$$\frac{\partial X_E}{\partial \tau} > 0 \Longrightarrow S^* \uparrow$$

$$If\ \overline{K_F} \uparrow$$

6.1 Equational Structure (Long-Run Scenario):

$$Wa_{L1} + ra_{K1} = 1 \quad (1)$$

$$W_S a_{S2} + \bar{W} a_{L2} + ra_{K2} = P_2^*(2) \quad (2)$$

$$W_S a_{SE} + r a_{KE} = C_E \quad (3)$$

$$X_E C_E = \tau \left(W_S (S - S^*) \right) \quad (4)$$

$$a_{L1} X_1 + a_{L2} X_2 = N - S \quad (5)$$

$$a_{K1} X_1 + a_{K2} X_2 + a_{KE} X_E = K_D + \overline{K_F} \quad (6)$$

$$a_{S2} X_2 + a_{SE} X_E = S - S^* (W_S^* - W_S) \quad (7)$$

$$Y = X_1 + P_2 X_2 + C_E X_E \quad (8)$$

$$\dot{S} = X_E - \delta_1 S \quad (9)$$

7. Comparative Statics (Long-Run Scenario):

7.1 Phase Diagrams:

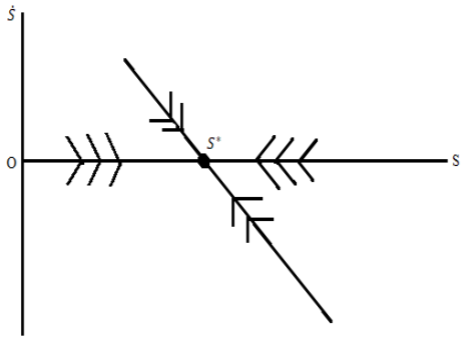


Fig. 1

In **Figure 1**, S* is the steady state level of skill acquisition in the economy.

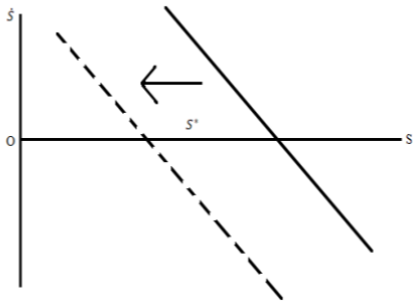


Fig. 2

Figure 2 shows that FDI inflow leads to fall in S*(a leftward shift of the curve) which shows that the 'rate of change of the growth rate of skill acquisition' falls.

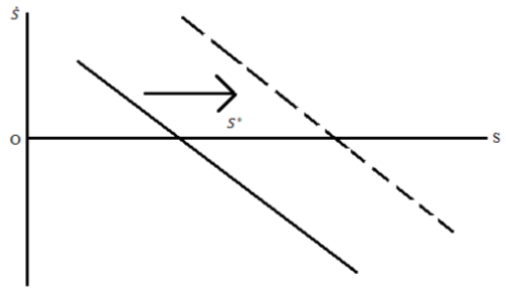


Fig. 3

Figure 3 shows that an increase in the rate of proportional tax leads to rising in S*(a rightward shift of the curve) which shows that the 'rate of change of the growth rate of skill acquisition' rises.

In the long run, we obtained the following two propositions

7.2 FDI Inflow:

In the long run, an increase in FDI inflow would lead to a fall in the output of the educational sector (X_E) and a subsequent fall in the skilled labour (S) in the home country.

Proposition 1: Increase in Foreign Direct Investment leads to lower educational output (X_E), ultimately leading to a fall in the skilled labour (S) in the home country. Therefore, in the long run, human capital falls.

7.3 Tax Rate:

Proposition 2: Increase in the proportional tax rate leads to a rise in the educational output (X_E), ultimately leading to a rise in the skilled labour (S) in the home country. Therefore, in the long run, human capital rises.

8. Conclusion

We have shown in our paper that in the short run, an FDI inflow will result in higher fiscal expenditure on education (C_E), which leads to a fall in educational output (X_E) and a fall in brain drain. An increase in the proportional tax rate in the short run leads to an increase in the fiscal expenditure on education (C_E), a fall in brain-drain, and an increase in the educational output (X_E). Now, a situation arises if the increase in educational output

dominates the increase in the tax rate (τ). In that case, the fiscal expenditure on education falls, ultimately leading to a rise in brain drain. In the long run, we show that the growth rate of skilled labour is a positive function of educational output (X_E) and a negative function of the depreciation rate (δ_1). An increase in the inflow of Foreign Direct Investment leads to a fall in the educational output (X_E), thereby leading to a fall in the skilled labour (S) in the home country, ultimately leading to a fall in the human capital. An increase in the proportional tax rate will lead to a rise in the educational output (X_E), thereby leading to a rise in the skilled labour (S) in the home country, ultimately leading to a rise in human capital.

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Mathematical Appendix I

$$Wa_{L1} + ra_{K1} = 1 \quad (1)$$

$$W_S a_{S2} + \bar{W} a_{L2} + ra_{K2} = P_2^* \quad (2)$$

$$W_S a_{SE} + ra_{KE} = C_E \quad (3)$$

$$X_E C_E = \tau \left(W_S (S - S^*) \right) \quad (4)$$

$$a_{L1} X_1 + a_{L2} X_2 = N - S \quad (5)$$

$$a_{K1} X_1 + a_{K2} X_2 + a_{KE} X_E = K_D + \overline{K_F} \quad (6)$$

$$a_{S2} X_2 + a_{SE} X_E = S - S^* (W_S^* - W_S) \quad (7)$$

$$\dot{S} = X_E - \delta_1 S \quad (8)$$

$$Y = X_1 + P_2 X_2 + C_E X_E \quad (9)$$

Logic:

1. $\overline{K_F} \uparrow \Rightarrow total\ capital\ supply \uparrow \Rightarrow Rybczynski\ effect \Rightarrow X_2 \uparrow, X_1 \downarrow, X_E \downarrow$

$$\because X_E \downarrow, to\ maintain\ balanced\ budget$$

$$C_E \uparrow$$

$$C_E \uparrow \Rightarrow Stolper - Samuelson\ effect \Rightarrow W_S \uparrow, r \downarrow$$

$$r \downarrow \Rightarrow cost\ of\ production\ in\ Sector\ 1 \downarrow$$

$$\Rightarrow DDL \uparrow \Rightarrow W \uparrow$$

$$\because W_S \uparrow \Rightarrow S^* \downarrow (brain - drain \downarrow)$$

In the L-R, $X_E \downarrow \Rightarrow S \downarrow$ ($human\ capital \downarrow$)

Thus in L-R, $\overline{K_F} \uparrow \Rightarrow S \downarrow$

2. $\tau \uparrow$

$$C_E \uparrow \Rightarrow W_S \uparrow \Rightarrow S^* \downarrow \Rightarrow (S - S^*) \uparrow \Longrightarrow X_E \uparrow$$

If $X_E \uparrow > \tau \uparrow, then\ C_E \downarrow$

$$C_E \downarrow \Rightarrow W_S \downarrow, r \uparrow, W \downarrow$$

$$\downarrow S^* \uparrow (brain - drain\ ultimately \uparrow)$$

$$LR: X_E \uparrow \Rightarrow S \uparrow (human - capital \uparrow)$$

$$\therefore In\ LR: \tau \uparrow \Rightarrow S \downarrow$$

Substituting (1), (2), and (3) in (9)

$$Y = (WL_1 + \bar{W}L_2) + r(1 - \tau)K_D + rK_f + W_S(1-\tau)(S - S^*(W_S^* - W_S))$$

$$+ \tau [rK_D + W_S(S - S^*(W_S^* - W_S)$$

(9.1)

Eq. (9) represents national income (Y) as value-added method

Eq. (9.1) represents national income as income approach

$$Unknowns: W, r, W_S, C_E, X_1, X_2, X_E, Y\ in\ the\ S - R$$

$$Unknowns\ in\ the\ LR: W, r, W_S, C_E, X_1, X_2, X_E, Y, S, K_D$$

Solution: (2) & (3) $\rightarrow W_S$ & $r\ as\ a\ fn\ of\ C_E$

(1) → W as a fn of C_E

(5) & (6) $\rightarrow X_1 \& X_2\ as\ a\ fn\ of\ C_E$

(7) $\rightarrow X_E\ as\ a\ fn\ of\ C_E$

(4) $\rightarrow C_E$ final value

Diff (2)

$$a_{S2}dW_S + a_{K2}dr = 0 \qquad (2.1)$$

Diff (3)

$$a_{SE}dW_S + a_{KE}dr = dC_E \quad (3.1)$$

$$\begin{bmatrix} a_{S2} & a_{K2} \\ a_{SE} & a_{KE} \end{bmatrix} \begin{bmatrix} dW_s \\ dr \end{bmatrix} = \begin{bmatrix} 0 \\ dC_E \end{bmatrix}$$

$$[\lambda_1] = a_{S2}a_{KE} - a_{K2}a_{SE}$$

If sector 2 is K-intensive and Sector E is S-intensive then

$$\frac{a_{K2}}{a_{S2}} > \frac{a_{KE}}{a_{SE}} \Longrightarrow a_{K2}a_{SE} > a_{K2}a_{S2}$$

$$\therefore [\lambda_1] < 0$$

$$dW_S = \frac{|0\ a_{K2}\ d_{CE}\ a_{KE}\ |}{|\lambda_1|} = \frac{-a_{K2}dC_E}{|\lambda_1|} \qquad (2.1.1)$$

$$dr = \frac{|a_{S2}\ 0\ a_{SE}\ d_{CE}\ |}{|\lambda_1|} = \frac{a_{S2}dC_E}{|\lambda_1|} \qquad (3.1.1)$$

Diff (1)

$$a_{L1}dW + a_{K1}dr = 0 \qquad (1.1)$$

$$\Rightarrow dW = \frac{-a_{K1}a_{S2}dC_E}{a_{L1}|\lambda_1|} \qquad (1.1.1)$$

Diff (5),

$$a_{L1}dX_1 + a_{L2}dX_2 = -dS \qquad (5.1)$$

Diff (6),

$$a_{K1}dX_1 + a_{K2}dX_2 = dK_D + d\overline{K_F} - aK_E dX_E \qquad (6.1)$$

$$\begin{bmatrix} a_{L1}\ a_{L2} \\ a_{K1}\ a_{K2} \end{bmatrix} \begin{bmatrix} dX_1 \\ dX_2 \end{bmatrix} = \begin{bmatrix} -d_S \\ dK_D + d\overline{K_F} - a_{KE}dX_E \end{bmatrix}$$

$$|\lambda_2| = a_{L1}a_{K2} - a_{K1}a_{L2}$$

Assuming sector-1 to be L-intensive

$$|\lambda_2| > 0$$

$$dX_1 = \frac{\begin{vmatrix} -d_S & a_{L2} \\ dK_D + d\overline{K_F} - a_{KE}dX_E & a_{K2} \end{vmatrix}}{|\lambda_2|}$$

$$= \frac{-a_{K2}dS - a_{L2}(dK_D + d\overline{K_F} - a_{KE}dX_E)}{|\lambda_2|} \quad (5.1.1)$$

$$dX_2 = \frac{a_{L1}(dK_D + d\overline{K_F} - a_{KE}dX_E) + a_{K1}dS}{|\lambda_2|} \quad (6.1.1)$$

Diff (7)

$$a_{S2}dX_2 + a_{SE}dX_E = dS - \frac{\partial S^*\,(-dW_S)}{\partial(W_S^* - W_S)}$$

$$\Rightarrow \frac{a_{S2}a_{L1}(dK_D + d\overline{K_F} - a_{KE}dX_E)}{|\lambda_2|} + \frac{a_{S2}a_{K1}dS + a_{SE}dX_E}{|\lambda_2|}$$

$$= dS + \frac{\partial S^*}{\partial(W_S^* - W_S)}\left(\frac{-a_{K2}}{|\lambda_1|}dC_E\right)$$

$$\Rightarrow dX_E \underbrace{\left[\frac{-a_{S2}a_{L1}a_{KE}}{|\lambda_2|} + a_{SE}\right]}_{A_1}$$

$$= dS \overbrace{\left[1 - \frac{a_{S2}a_{K1}}{|\lambda_2|}\right]}^{A_2} - \frac{\partial S^*}{\partial(W_S^* - W_S)}\frac{a_{K2}}{|\lambda_1|}dC_E - \frac{a_{S2}a_{L1}}{|\lambda_2|}\left(dK_D + d\underline{K_f}\right)$$

$$\Rightarrow dX_E = \frac{A_2}{A_1}\,dS - \frac{\partial S^*}{\partial(W_S^* - W_S)}\frac{a_{K2}}{|\lambda_1|A_1}dC_E - \frac{a_{S2}a_{L1}}{|\lambda_2|A_1}(dK_D + d\overline{K_F})$$

$$- (7.1)$$

Diff. (4)-

$$C_E dX_E + X_E dC_E = \tau[W_S(-dS^*) + (S - S^*)dW_s + rdK_D] + (W_S(S - S^*) + rK_D)d\tau$$

$$\Rightarrow C_E dX_E + X_E dC_E$$

$$= \tau\left[W_S\frac{\partial S^*}{\partial(W_S^* - W_S)}dW_S + (S - S^*)dW_S\right] + \left(W_S(S - S^*)\right)d\tau \quad - (4.1)$$

S-R comparative statics

$$1.\, d\overline{K_F} > 0\,;\, dK_D = 0, dS = 0, d\tau = 0$$

From (4.1) we get,

$$C_E dX_E + X_E dC_E = \tau \left[W_S \frac{\partial S^*}{\partial (W_S^* - W_S)} dW_S + (S^* - S) dW_S \right]$$

Substituting (7.1)-

$$C_E \left[\frac{-\partial S^*}{\partial (W_S^* - W_S)} \frac{a_{K2}}{|\lambda_2| A_1} \, dC_E - \frac{a_{S2} a_{L1}}{|\lambda_2| A_1} d\overline{K_F} \right] + X_E dC_E$$

$$= \tau \left[W_S \frac{\partial S^*}{\partial (W_S^* - W_S)} + (S - S^*) \right] \left(\frac{-a_{K2}}{|\lambda_1|} dC_E \right)$$

$$\Longrightarrow dC_E \left[\frac{-\partial S^*}{\partial (W_S^* - W_S)} \frac{a_{K2} C_E}{|\lambda_1| A_1} + X_E + \tau \left(\frac{W_S \partial S^*}{\partial (W_S^* - W_S)} + S - S^* \right) \frac{a_{K2}}{|\lambda_1|} \right]$$

$$= \frac{C_E a_{S2} a_{L1}}{|\lambda_2| A_1} \, d\overline{K_F}$$

$$When \; A_1 < 0, we \; get$$

$$\frac{\partial C_E}{\partial \overline{K_F}} > 0, \qquad from \; (2.1.1) \rightarrow \frac{\partial W_S}{\partial \overline{K_F}} > 0$$

$$from \; (3.1.1) \rightarrow \frac{\partial r}{\partial \overline{K_F}} < 0$$

$from \; (1.1.1) \rightarrow \frac{\partial W}{\partial \overline{K_F}} > 0$

$$from \; (7.1.1) \longrightarrow \frac{\partial X_E}{\partial \overline{K_F}} \lessgtr 0$$

$$if \; \frac{\partial X_E}{\partial \overline{K_F}} < 0, then \; \frac{\partial X_1}{\partial \overline{K_F}} < 0, \frac{\partial X_2}{\partial \overline{K_F}} > 0$$

$$\frac{\partial S^*}{\partial \overline{K_F}} < 0$$

Proposition 1:

$\uparrow \overline{K_F}$ *leads to higher fiscal expenditure on education, however, educational output* (X_E) *may fall*

$$Also, \overline{K_F}\ leads\ to\ lower\ brain-drain\ (S^*\downarrow)$$

$$2.\ d\tau > 0; d\overline{K_F} = 0, dS = 0, dK_D = 0$$

$$C_E\left[\frac{-\partial S^*}{\partial(W_S^* - W_S)}\frac{a_{K2}}{|\lambda_1|A_1}dC_E\right] + X_E dC_E$$

$$= \tau\left[W_S\frac{\partial S^*}{\partial(W_S^* - W_S)} + (S - S^*)\right]dW_S + W_S(S - S^*)d\tau$$

$$\Rightarrow dC_E\left[X_E - \frac{\partial S^*}{\partial(W_S^* - W_S)}\frac{a_{K2}C_E}{|\lambda_1|A_1} + \frac{a_{K2}}{|\lambda_1|}\ \tau\left(\frac{W_S\partial S^*}{\partial(W_S^* - W_S)} + S^* - S\right)\right]$$

$$= W_S(S - S^*)\ d\tau$$

$$\frac{\partial C_E}{\partial \tau} \lessgtr 0$$

$$if\ \frac{\partial C_E}{\partial \tau} < 0, then\ \frac{\partial X_E}{\partial \tau} > 0, \frac{\partial X_1}{\partial \tau} > 0, \frac{\partial X_2}{\partial \tau} < 0$$

$$\frac{\partial W_S}{\partial \tau} < 0\ ;\ \frac{\partial r}{\partial \tau} > 0\ ;\ \frac{\partial W}{\partial \tau} < 0$$

$$\frac{\partial S^*}{\partial \tau} > 0$$

$$An\ \uparrow\ \tau\ leads\ to\ \uparrow\ X_E\ and\ \uparrow in\ brain-drain$$

<u>LR:</u>

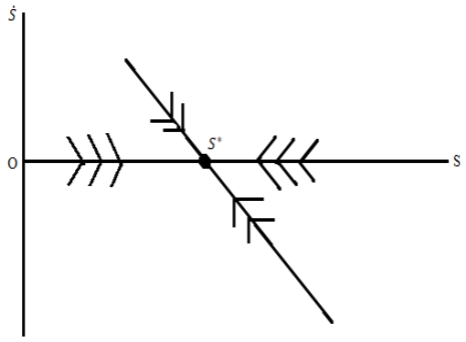
$$\dot{S} = X_E - \delta_1 S$$

In absence of population growth rate

i.e. $\frac{1}{N}\frac{dN}{dt} = 0,$

LR steady state:

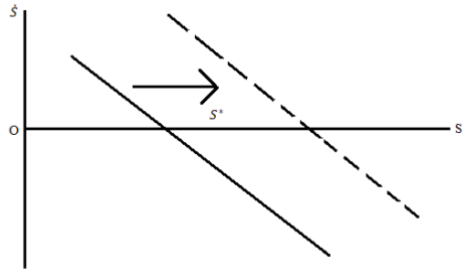
$$\dot{S} = \frac{dS}{dt} = 0;$$



$$\Longrightarrow X_E = \delta_1 S \Longrightarrow S^* = \frac{X_E}{\delta_1}$$

$$\frac{d\dot{S}}{dS} = \frac{\partial X_E}{\partial S} - \delta_1$$

$for\ steady\ state\ to\ be\ monotonically\ converging, \frac{d\dot{S}}{dS} < 0$



$$\Longrightarrow \frac{\partial X_E}{\partial S} < \delta_1$$

$$If\ \tau \uparrow$$

$$\frac{\partial X_E}{\partial \tau} > 0 \Longrightarrow S^* \uparrow$$

$$If\ \overline{K_F} \uparrow$$

$$\frac{\partial X_E}{\partial \overline{K_F}} < 0 \Rightarrow S^* \downarrow$$

Mathematical Appendix II

$$Wa_{L1} + ra_{K1} = 1 \qquad (1)$$

$$W_S a_{S2} + \bar{W} a_{L2} + ra_{K1} = P_2^* \qquad (2)$$

$$W_S a_{SE} + ra_{KE} = C_E \qquad (3)$$

$$X_E C_E = \bar{T} \qquad (4)$$

$$a_{L1} X_1 + a_{L2} X_2 = \theta - S \qquad (5)$$

$$a_{S2} X_2 + a_{SE} X_E = S - S^*(W_S^* - W_S) \qquad (6)$$

$$a_{K1} X_1 + a_{K2} X_2 + a_{KE} X_E = K_D + \overline{K_F} \qquad (7)$$

$$y = X_1 + P_2 X_2 + \bar{T} \qquad (8)$$

$$(3,2) \rightarrow W_S, r\ (C_E) \qquad (1) \rightarrow W(C_E)$$

$$\widehat{W_S} = \frac{-\theta_{K2}}{|\theta|} \widehat{C_E}\ \}\ dW_S = \frac{-a_{K2}}{|\lambda_1|} dC_E$$

$$\hat{r} = \frac{\theta_{S2}}{|\theta|} \widehat{C_E}\ \}\ dr = \frac{a_{S2}}{|\lambda_2|} dC_E$$

$$\widehat{W} = \frac{-\theta_{K1}}{\theta_{L1}} \frac{\theta_{S2}}{|\theta|} \widehat{C_E}\ \}\ dW = \frac{-a_{K1}}{a_{L1}} \frac{a_{S2}}{|\lambda_1|} dC_E$$

$$a_{L1} dX_1 + a_{L2} dX_2 = -dS \qquad (5.1)$$

$$a_{K1} dX_1 + a_{K2} dX_2 + a_{KE} dX_E = d\overline{K_F} \qquad (6.1)$$

$$dX_1 = \frac{-a_{K2} dS - a_{L2}(\, d\overline{K_F} - a_{KE} dX_E)}{|\lambda_2|}$$

$$dX_2 = \frac{a_{L1}(\,d\overline{K_F} - a_{KE}dX_E) + a_{K1}dS}{|\lambda_2|}$$

$$dX_E = \frac{A_2}{A_1}dS - \frac{\partial S^*}{\partial(W_S^* - W_S)}\frac{a_{K2}}{|\lambda_1|A_1}dC_E - \frac{a_{S2}a_{L1}}{|\lambda_2|A_1}d\overline{K_F}$$

$$C_E dX_E + X_E dC_E = d\bar{T}$$

$$\Rightarrow \left(\frac{A_2}{A_1}dS - \frac{\partial S^*}{\partial(W_S^* - W_S)}\frac{a_{K2}}{|\lambda_1|A_1}dC_E - \frac{a_{S2}a_{L1}}{|\lambda_2|A_1}d\overline{K_F}\right)C_E + X_E dC_E = d\bar{T}$$

$$\Rightarrow dC_E\left(X_E - \frac{\partial S^*}{\partial(W_S^* - W_S)}\frac{a_{K2}}{|\lambda_1|A_1}\right) = d\bar{T} + \left(\frac{a_{S2}a_{L1}}{|\lambda_2|A_1}d\overline{K_F} - \frac{A_2}{A_1}dS\right)C_E$$

$$Given\ |\lambda_2| > 0, |\lambda_1| < 0$$

$$dS = 0, d\bar{T} = 0, d\overline{K_F} > 0$$

$$dC_E > 0, dW_S > 0\ , dr < 0\ , dW > 0$$

$$dX_1 < 0\ , dX_2 > 0\ , dX_E < 0$$

$$dS^* < 0$$

$$dS = 0, d\bar{T} > 0, d\overline{K_F} = 0$$

$$dC_E > 0, dW_S > 0\ , dr < 0\ , dW > 0$$

$$dX_1 > 0\ , dX_2 < 0\ , dX_E > 0$$

$$dS^* < 0$$

Long-Run:

$$S^* = \frac{X_E}{\delta_1}$$

$$d\overline{K_F} > 0 \Longrightarrow S^* \downarrow$$

$$d\bar{T} > 0 \Rightarrow S^* \uparrow$$

Diff (8)-

$$dy = dX_1 + P_2 dX_2 + d\bar{T}$$

Substitute dX_1& dX_2

$$\Longrightarrow dX_1 + P_2 dX_2 + d\bar{T}$$

$$dy \Rightarrow \frac{a_{L2}a_{KE}}{|\lambda_2|} dX_E + P_2 \frac{(-a_{KE}a_{L1})}{|\lambda_2|} dX_E + d\bar{T}$$

$$\Rightarrow \frac{1}{|\lambda_2|}(a_{L2}a_{KE} - P_2 a_{KE}a_{L1}) dX_E + d\bar{T}$$

$$\Longrightarrow \frac{-a_{KE}}{|\lambda_2|}(a_{L2} - P_2 a_{L1}) \frac{\partial S^*}{\partial (W_S^* - W_S)} \frac{a_{K2}}{|\lambda_1| A_1} dC_E + d\bar{T}$$

$$\Longrightarrow \left[\frac{-a_{KE}a_{K2}}{|\lambda_2||\lambda_1|A_1}(a_{L2} - P_2 a_{L1}) \frac{\partial S^*}{\partial (W_S^* - W_S)} \frac{1}{\left(X_E - \frac{\partial S^*}{\partial (W_S^* - W_S)} \frac{a_{K2}}{|\lambda_1| A_1} \right)} + 1 \right] d\bar{T}$$

$$\frac{dy}{dT} = 1 - \frac{a_{KE}a_{K2}(a_{L2} - P_2 a_{L1})}{|\lambda_2||\lambda_1|A_1 \left(X_E - \frac{\partial S^*}{\partial (W_S^* - W_S)} \frac{a_{K2}}{|\lambda_1| A_1} \right)} \frac{\partial S^*}{\partial (W_S^* - W_S)} > 0$$

Taxes Done Right:

A Comparative Analysis of Income Tax vs Consumption Tax

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Abstract

Taxation and the laws surrounding taxation are what drives an individual's finances and to an extension, the finances of a country or economy. Income tax or income-based taxation systems have long been the preferred choice of direct taxation of individuals in an economy. This paper seeks to show how income tax or income-based taxation systems fail to satisfy the basic purpose of taxes that is to reduce inequality and how they are incentivizing criminal activity through possession of black money. The paper provides an alternative taxation system in the form of a solely consumption-based taxation system and discusses its various dimensions and applicability issues

Keywords: Optimal Taxation, Tax Law, Tax Avoidance

JEL Classification: E29, H21, H26, K34

Consider a hypothetical situation where an individual signs up to be a part time pizza delivery person and gets paid in pizzas instead of money. Now, imagine being that person, and working a few hours, just hard enough to earn one pizza pie. Unfortunately, as soon as you are about to consume the pizza (that you worked hard to earn), someone takes a couple of slices of the pie and leaves without much of an explanation. Even though you might think that this is quite a bizarre scenario, you would be shocked to realise that this is in fact the reality that most people live with and thus, this is exactly the situation we try to understand and deal with in this paper.

This paper seeks to analyse the various dimensions of the income-based system of taxation or income tax. We start off by understanding the fundamentals of income tax and how it affects an average individual. Every year, millions of adults all over the world are stripped out of huge chunks of their income by their respective governments. Income tax was introduced as an economic reform meant to reduce income inequality within an economy as well as provide the government with tax revenue to carry out its operations. This system of taxation is considered by many to be the fairest form of tax (Pava, 2017). This rationale, however, doesn’t seem fair to a large sum of the population at all.

1. **Income Tax: Simplified**

Imagine there to be a family consisting of a parent(s) and a set of quintuplets (A, B,C,D,E). During their summer break from middle school A decides to open up a lemonade stand; B decides to start a paper route; C decides to do petty chores for the neighbours; D decides to go to summer camp as a vacation and E decides to relax at home all summer. At the end of the break, A had earned $50; B $30 and C $10. The parent now makes them pay some amount of their earnings for the greater good of the family as a whole. In the end, A is made to pay 30% of their income ($15); B is made to pay 20% of their earnings ($6) and C is made to pay 10% of their earnings ($1). The family now has an extra $22 for everyone's welfare. However, it is obvious to notice that even though D and E did not work during the break, they still get to benefit from the pooled up $22. On the other hand, the most hard-working person A, gets to lose the highest share of their earnings.

If we look at the quintuplets as the citizens in an economy and the parent(s) as the government, it is clear to see that the above example describes an income tax system. This system that is claimed to be the fairest system of taxation penalises people for working hard and earning more and rewards people for working less or not working. This current system might work in some cases, but it is clear to infer from the above example that there is some room for improvement at the very least. The next section looks at where exactly the current system fails and how big of a problem it really is. Throughout the paper, the impact of a tax system would be analysed based on how it affects the three main sectors of an economy – Firms, Households and Government.

2. **Downfall of Income Tax**

The technicalities behind how income tax works varies from country to country and sometimes from state to state. All of these different systems, however, have similar shortcomings. As demonstrated by the above example, income tax disincentivizes earning more. What does this mean exactly?

Let's define a basic slab tax function to see how income tax disincentivizes earning more. The following function is an accurate illustration of a simplified income tax system followed in most parts of the world:

$$t(x) = \begin{cases} x - \left(\frac{10x}{100}\right) \; ; 0 \leq \; x \leq 100 \\ x - \left[\left(\frac{10 \; \times \; 100}{100}\right) + \left(\frac{15(x-100)}{100}\right)\right] \; ; \quad 100 < x \leq 200 \end{cases}$$

This function defines the amount of disposable income a person would have after income tax such that any person earning up to 100 units is taxed at 10% and any income above 100 units is taxed at 15%. Let us assume that a person can earn 10 units by working for 1 hour. A person earning 100 units after working for 10 hours will only be left with 90 units or 9hours worth of earnings after tax. The following schedule shows how the other income levels are affected by this tax function:

Earnings	Hours spent	Tax amount	Tax amount in terms of hours	Disposable income left	Disposable income in percentage
100	10	10	1hour	90	90%
120	12	13	1.3 hours	107	89.1%
140	14	16	1.6 hours	124	88.5%
160	16	19	1.9 hours	141	88.1%
200	25	25	2.5 hours	175	87.5%

Table 1: Slab based tax function schedule

It is clearly visible that a higher income leaves a person with a lower percentage of disposable income. In response, one could argue that the people who earn more will still have more money even after paying higher taxes, thus giving them an incentive to work harder. To counter this claim and show how an individual is affected by taxation we must understand a

concept related to how we think and make decisions. The cognitive bias of loss aversion makes the 'pain' from any losses feel more powerful than the feeling of gain from the same or similar things. In the case of taxation, an individual is likely to focus on the part of their income that is being taken away from them for no reason rather than focusing on the additional income that they have generated. The 'pain' caused by the deduction of tax from their earnings may be enough for an individual to feel disincentivized about working harder and earning more (Knowledge@Wharton, 2018).

If a large proportion of taxpayers in an economy realise that working harder and earning more, essentially means giving away more of their income to the government, then we have a disaster at our hands. If the taxpayers have less incentive to earn more, then this affects every single aspect of the economy. People working less means a lower rate of production which by itself is enough to slash the GDP of an economy. But if we look further, it also means an impact on the consumption levels in the economy since the people no longer have enough income to boost aggregate demand (Figure 1). So it affects the production i.e. the firms, it affects the consumptions i.e. the households and it affects the amount of tax revenue that the government gets. So even the current taxation system, just by existing, has the possibility to absolutely destroy the economy by negatively affecting the three main sectors of the economy. These claims can further be understood through the following graph:

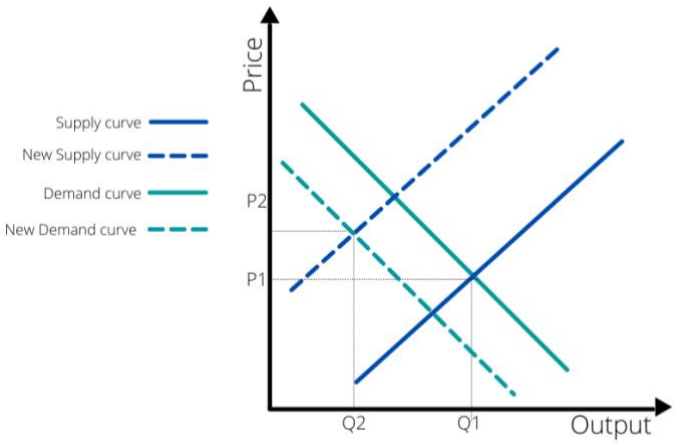


Figure 1: Fall in Demand and Supply

The above figure shows a situation where fall in supply (due to less incentive to work) and the fall in demand (due to a reduction in income level) results in a situation where the overall production and consumption of the economy has been affected and the prices have risen. The real GDP of the economy has therefore taken a hit.

Now that we have established the direct impact of the current taxation system on the economy, let's see what all of this means for individual citizens, particularly looking at the variation in which it impacts different individuals in an economy. It is now time to talk about inequality, which is one of the major reasons for the implementation of an income tax system.

The working of an income tax system is very similar to a robin hood tax system where the goal is to levy a higher tax on the rich to benefit the poor. This idea of whether the benefits of the tax collected actually reach the poor or not, is a highly debated topic. The only part of the 'robin hood system' that the current system holds up is the part of taxing the rich. The more important part of distributing this income to the weaker sectors of the economy, is not very efficient (Tanner 2019). Not only this but the existence of the tax system actually proves to be a resistance for the weaker sections to grow and develop. By providing certain sections of the society with certain benefits does not give them any incentive to grow out of their current position. Moreover, if they do try to grow out of their current situation, they have to face a situation where they would themselves have to pay income tax. If an individual willingly chooses to grow out of their poverty, then they would have to face a world where they may no longer get subsidies and other benefits (Dahl and Gielen, 2018). We must now look into what taxation means for the elite rich within an economy.

In theory, the impact of income tax on the rich should be no different than the rest of the economy. However, when this idea of taxation comes into practical use, people are quick to find loopholes (Ingraham, 2021). One of the most common and most serious loopholes being declarable income and black money. By its name itself one can understand that income tax is a tax on your income. But an individual can only be taxed on the income that they declare. This illegal way of avoiding taxes is much easier for ones who have the resources to find clever and creative ways around the tax law. So all in all, the elite rich are not impacted as much as they should be ("Inequality And Poverty: The Hidden Costs Of Tax Dodging" 2021)

Now that we know that the current taxation system fails to uplift the poor from poverty and also fails to control the wealth of the elite rich, we can now look at how the overall inequality within the economy is affected. We will do this by using the Gini Coefficient and Lorenz Curve. The Gini Coefficient (formula shown below) is one of the most popular measures of inequality within a country/economy. The coefficient denoted by 'G' indicates an inequality ratio, meaning that the higher the value of G, the worse is the inequality in that country/economy. We can draw the conclusion that taxes increase inequality by measuring the relation between the pre-tax and post-tax values of G.

$$G = \frac{\sum_{i=1}^{n} \sum_{j=1}^{n} |x_i - x_j|}{2n^2 \bar{x}}$$

In the above formula x denotes the value of an observation/individual/sector within the economy. X bar is the mean of all such observations and n is the number of such observations taken into consideration. These observations or units can be as small as an individual. Let's assume that the economy is made up of three units (observations), the poor, the middle class and the elite rich. Therefore, we have n as 3. Keeping this in mind the above equation can be elaborated as:

$$G = \frac{|x_1 - x_2| + |x_1 - x_3| + |x_2 - x_1| + |x_2 - x_3| + |x_3 - x_1| + |x_3 - x_2|}{2 \times 3^2 \times \bar{x}}$$

$$= \frac{2(|x_1 - x_2| + |x_2 - x_3| + |x_3 - x_1|)}{2 \times 9 \times \left(\frac{x_1 + x_2 + x_3}{3}\right)}$$

$$G = \frac{(|x_1 - x_2| + |x_2 - x_3| + |x_3 - x_1|)}{3(x_1 + x_2 + x_3)}$$

All x_i in the equation are a measure of wealth with that particular segment. Therefore we have:

$$x_1 < x_2 < x_3$$

Since the elite rich hold the major chunk of any economy's wealth followed by the middle class and at last the poor. We can now use this to further simplify our equation.

$$G = \frac{x_2 - x_1 + x_3 - x_2 + x_3 - x_1}{3(x_1 + x_2 + x_3)}$$

$$= \frac{2(x_3 - x_1)}{3(x_1 + x_2 + x_3)}$$

This is the measurement of inequality in an economy with only three segments, which is not yet affected by taxation. We now introduce a G' which is a measure of inequality after taxes. We shall use some of the conclusions stated before to come to an even more solid conclusion.

$$G' = \frac{2(x'_3 - x'_1)}{3(x'_1 + x'_2 + x'_3)}$$

Here, G' is the Gini coefficient after tax and all x'_i are the wealth of each segment after tax.

We can now use the conclusions we arrived at before i.e., Redistribution of tax revenue to the poor is a highly inefficient way to raise them out of poverty. Moreover, they also find it

difficult to leave behind a life with subsidies and benefits when coming out of poverty. The middle class is affected quite negatively by taxes, they are the ones who pay the taxes but get almost zero direct benefit as this direct benefit is in most cases exclusive to the poor. The elite rich have the resources to cheat the system and accumulate black money in order to avoid taxes. They end up increasing their wealth despite there being taxes. These can be expressed as follows:

$$x'_1 \approx x_1$$
$$x'_2 < x_2$$
$$x'_3 > x_3$$

Using the above relations we can say,

$$(x'_3 - x'_1) > (x_3 - x_1)$$
$$\Rightarrow \frac{2(x'_3 - x'_1)}{3} > \frac{2(x_3 - x_1)}{3}$$

The overall wealth within the economy that is, $(x_1 + x_2 + x_3)$, should remain almost equal even after taxes. This is because taxes in general, as we defined before, are a way to redistribute income and not a way to disrupt the economic flow within the economy by massively changing the overall wealth in the economy. Therefore we have:

$$x_1 + x_2 + x_3 \approx x'_1 + x'_2 + x'_3$$
$$\Rightarrow \frac{1}{x_1 + x_2 + x_3} \approx \frac{1}{x'_1 + x'_2 + x'_3}$$

Using all the above equation we now have,

$$\frac{2(x'_3 - x'_1)}{3(x'_1 + x'_2 + x'_3)} > \frac{2(x_3 - x_1)}{3(x_1 + x_2 + x_3)}$$
$$\Rightarrow G' > G$$

Therefore, an implementation of tax within an economy increases the value of the Gini coefficient meaning that the introduction of tax has increased the inequality within the economy. This can be visually represented through a Lorenz curve which shows the level of inequality within an economy by mapping the Gini coefficient as a proportion of the area between the curve and the 45° line (also known as the line of perfect equality), and the total area under the 45° line. The higher the value of the Gini coefficient, the further away the curve is from the line of perfect equality which represents a higher degree of inequality in the economy. The following Lorenz curve is a representation of the impact of taxation on the inequality in an economy as was shown previously through the mathematical derivation above.

In this particular case, the middle line represents an economy in a pre-tax stage. The dotted line represents the post-tax curve of an economy. The dotted line (post-tax curve) is further away from the line of perfect equality as compared to the pre-tax curve which represents a higher degree of inequality in the economy. It is important to note that even in the pre-tax phase, inequality exists in an economy. However, this level of inequality increases once the economy goes through a stage of taxation. The Gini coefficient and the Lorenz curve essentially show the same thing, which in this case is the conclusion that post-tax inequality is worse than pre-tax inequality.

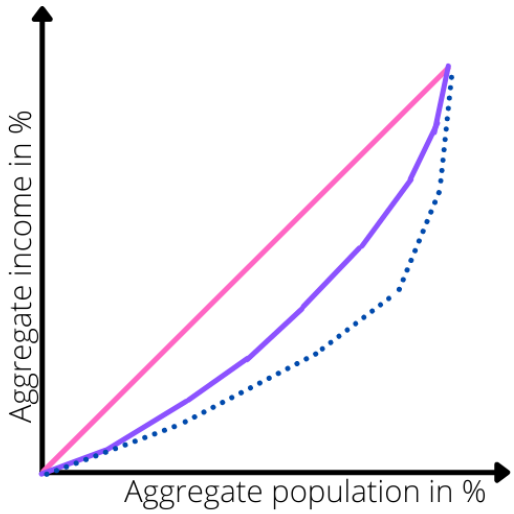


Figure 2: Taxation induced shift in the Lorenz Curve

We have successfully established that the current system of taxation based on income is not ideal. Not only does this system worsen one of the things that it set out to improve (inequality), it also establishes a clear incentive for the rich to evade taxes and commit a crime, while certainly not being fair to the people whose lives it set out to improve. It is only a matter of time until a large number of taxpayers realise this reality, which means it is only a matter of time until our economic systems start to crumble from within.

3. **Where do we go from here?**

We have successfully been able to prove that income tax is not the best taxation system for a society when it comes to maximising social welfare. So what do we do now? Do we scrap the existing system and replace it with a new one? Is it even possible to execute something like this? And more importantly, how do we come up with a better taxation system? These are some of the questions that we shall try to tackle in this next part of the paper.

Let us start with what an ideal system of taxation should look like. Let's look at a few key characteristics of this ideal taxation system that makes it ideal:

- Reduces Inequality –

An ideal taxation system should satisfy one of the essential purposes of having a taxation system, that is, to reduce inequality in a proper manner. This means elevating the financial status of the poor in the economy and providing fair barriers to slow down the rate of growth of the rich in the society.

- Does not disincentivize growth –

Unlike what we discussed before with regards to the income-based taxation model, the restrictions caused by the existence of the taxation system should not be harsh enough to disincentivize people from working and climbing up the social ladder.

- Provide a steady source of revenue for the government –

As per the functioning of any good taxation system, the tax collected should act as a sufficient source of income for the government to carry out its regular activities and functions. This means that the tax rate and tax formula should not be so harsh as to exploit the population but not low enough to be insufficient for the functions of the government. In other words the tax rate and tax formula should be such that it lies at the maxima point on the Laffer curve[1.]

What we infer from the previously mentioned aspects of our new tax is that the tax should be made in such a way that it impacts people based on their position in the society while also not dividing the society into groups or slabs which could end up to be barriers for growth for some people. The taxation function should be a continuous function wherein the amount of tax payable keeps changing marginally as per a marginal movement in the social standing of the person.

[1] The Laffer curve is an economic concept that indicates the trade-off between rates of taxes and the amount of tax revenue collected. The highest point of a Laffer curve is where the tax revenue is maximised.

4. **What does this new tax look like?**

So far, we have been looking at people's responsibility to pay taxes as per the income they generate. And we have also seen how this gave incentive for people to hoard black money and commit tax fraud.

For this new tax, we need to come up with a new way to look at the worth or responsibility of a person to pay taxes. Income was not a totally awful aspect to judge this so we shall start from there. Let us look at one of the aspects of an individual's role in the society which is almost always directly proportional to their income i.e. Consumption as a way to judge a person's responsibility to pay taxes. We are now looking at a taxation system that levies taxes not based on the money coming into one's hand but on the money leaving one's hand. This way people do not have an incentive to hide their incomes and on the other hand it is extremely difficult for anyone to hide their consumption from the world.

The fundamental principle behind a consumption-based taxation system is the idea that an individual should not be taxed (or penalised in a sense) for working hard and earning more money. It is not fair for a person to share a part of their income with the government for nothing. Instead this system allows the people to be held accountable for their usage of their income. We can address this by asking the question, "what does income inequality really mean?".

A person's income lying idle does no good to them and does not make them better off than others in a substantial way. It is only what a person chooses to do with their money or rather what a person is capable of doing with respect to their income which creates inequality. Therefore, judging a person's contribution to the income inequality in a society is better served when we look at the consumption patterns of individuals rather than just the amount they earn.

5. **Is a consumption-based taxation system fair?**

A consumption-based taxation system ensures that an individual only pays how much they are capable of paying. Consumption is a great way to find out about a person's financial status which can then be used to calculate the amount of tax payable by them.

Taxes are supposed to be a way to generate revenue for the government as well as reduce inequality. A consumption-based taxation system creates a sufficient amount of revenue for the government and at the same time takes care of income inequality since an increase in income increases an individual's propensity to consume. This means that even without a system

in place such as slabs or tax thresholds, this system automatically takes care of inequality since a person with a higher income is more likely to consume more than a person with low income.

6. What would such a tax system even look like?

There are quite a few ways in which we can go about this system, but we first need to figure out the foundations on which this system will be built. One of the key areas to consider first is whether the taxation system should be based on a direct or indirect tax. An indirect tax means that the individuals in a society would be indirectly charged a tax on their consumption which they are not directly liable to pay to the government. If this new system of taxation were to be built as an indirect tax model, it would mean imposing an additional tax on top of the existing sales tax or goods and services tax. Not only would this mean having a rather complicated system for calculating and charging tax, it would also mean more technicalities and rules and regulations to be followed by businesses.

There is however another way to apply this taxation system with an indirect approach. Governments could, in theory, remove the income-based tax system without replacing it with a new tax. This can be done by increasing the tax rates on the already existing common goods and services tax in the country (excluding certain classes of goods and services). The increase in interest rates would ensure that the government does not lose out on tax revenue but also retain the principle that people should be charged tax based on their consumption. But would such a system even work? Well, this system clearly trumps adding an additional separate tax on the existing goods and services tax, due to the sheer amount of technical changes that would need to be made to make the latter possible.

7. Problems with increasing the existing sales tax

In order to cover up the lost tax revenue of the government earlier collected from income tax; we saw that the sales tax would have to be increased in order to come closer to the tax revenue collected earlier. This might however not be how things turn out. As discussed earlier in this paper, according to economic theory, the relationship between tax rates and the total tax revenue collected can be seen through a Laffer curve which is bell shaped because of the fact that high enough tax rates would eventually lead to lower consumption thus driving down the tax revenue. This means that there is a chance that increasing the existing indirect tax in the country could lead to lower-than-expected tax revenue generation. There is an argument

against it which states that consumption levels might not get driven down even after an increase in indirect tax rates because individuals in the economy would have a higher disposable income than before since now, they don't have to pay income tax. Meaning that higher tax rates should not bother people as much because they no longer have to pay income tax. This argument still isn't as simple as it seems. We can think of a situation where there are no income taxes to be paid but there are higher rates of indirect tax. Now, even though the individuals in the economy would have higher disposable income, when it comes down to day-to-day purchases and spending, the concept of loss aversion applies once again. People would be more wary of spending more money than before because losing money has a psychologically stronger negative effect than the positive effect of gaining that extra bit of disposable income. Therefore, it is more likely that a situation arises where increasing tax rates may lead to lower tax revenues even after removing the income tax from the situation.

There are some other aspects which make it harder for such a tax to be implemented. From what we have discussed till now, people still might be open to spending more because they have more disposable income. But what about the people who were unaffected by the removal of the income tax system? They did not necessarily gain anything from the removal of income tax (except for the restrictions on them to grow out of poverty) but now they have to pay higher prices for goods and services because of the higher indirect tax rates. Now of course this proves to be a very valid reasoning for an extensive ration program in the country. One that actually works to provide benefits to everyone up until a certain level of consumption. This however is out of the scope of this paper.

So, from what we have discussed so far, it is extremely difficult to manage to replace the income tax system with a higher tax level of indirect taxes because there exist some fundamental issues with how it would operate once implemented.

8. **Where does this leave us?**

Well, we definitely know now that the current taxation system is not totally ideal since it does not prove to be of much help with the very thing it was implemented for (inequality). Replacing the income-based taxation system in a phased manner with a consumption-based taxation system in the form of higher tax levels of the already existing indirect sales/goods/services tax in the economy would prove to be of help with regards to dealing with

aspects like inequality but might face some troubles on the side of maintaining a steady source of revenue for the government. However, as it was just mentioned, introducing these changes in a phased manner might actually prove to be the best option to implement the tax since this way the individuals in the economy as well as the government would be introduced into a new stage of taxation in a manner which is slow enough not to leave scope for speculation from the public about higher rates of taxation as well as less scope for the government to be faced with a situation with insufficient funds.

This is the future of taxation. This is the future that will lead us into a more financially equal world.

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