Modelling the gender inequality in Pakistan: A macroeconomic perspective

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Abstract: The paper takes up the case of gender build inequality and its potential repercussions on economic growth of Pakistan. Using cointegration and causality analysis, we explore the relationship between gender inequality and its macroeconomic determinants i.e. economic growth, financial development, trade openness and foreign direct investment. For the this purpose, we have applied the Bayer-Hanck combined cointegration approach to test the long-run relationship and Granger causality for causal links amid the variables on the most recent and extended time period data (1972-2013). The cointegration test results validate the long-run association among the underlying variables. We found economic growth and financial development ignite gender driven disparity. Whereas, trade openness and foreign direct investment found to reduce gender gap. The positive bidirectional causal link between economic growth and gender inequality portrays unhealthy socio-economic environment to reduce gender inequality in the country. The feedback effect exists between financial development and gender inequality.
Keywords: Financial Development, Trade Openness, Gender Inequality, Pakistan

I. Introduction

Is income inequality really a drag? What does it mean in a gender perspective? However, the macro-level policy structure has numerous channels for studying gender issues. These public policies actually decide what goods and services should be produced, what the consumption style of the general public should be shaped and, where and for whom employment opportunities should be created. Later, these policies interact with gender relations to determine who gets a job and how much each gender will earn. Macro-level policies also affect economic volatility and resources for education and health, all of which influence gender status. The improving economic indicators augment gender inequality if governments ignore women's potential (Connor et al. 1999). Therefore, gender has an important role to play in public policy (True, 2003). For decades, gender inequality has substantially decreased in the developed part of the world, but consistently persists in developing and under developing countries. The gender gap in availing the opportunity of health, education and employment is dangerously wide in developing countries (Dreze and Sen 1989, Kalasen 2002). Consequently, the United Nations has ranked gender inequality third on its list of eight millennium development goals (MDGs).[1] The goal is to promote gender equality and empower women. It is now growing consensus that the provision of social liberty and equal access to basic socio-economic righs of women are subject to her financial empowerment (Garikipati 2008, Vyas and Watts 2009). Although, globalization has imparted significant reduction in global income inequality, but gender inequality has observed an increasing trend, especially after the global financial crisis (Antonopoulos 2009, Seguino et al. 2009).

i) Trade and Gender Inequality

The establishment of the WTO[2] aims to reduce the trade barriers among the global economies that allows smooth flow of global capital (financial+human), goods and services across the globe. The multilateral trade agreements over the decades have provided equal opportunities for each country to benefit from growing global economic activities. However, the gender based wage inequality seems to rise in most of the developing countries (Wood, 1997). Since then, the issue of gender driven income inequality has become the topic of great interest for most of the development economists (Hanson et al. 1999, Attanasio 2004, Kumar and Mishra 2008). The issue of gender inequality in its all aspects has already under the close supervision of international organizations, i.e. United Nations, World Bank and IMF (Bessis, 2014). The common agenda of these organizations is to demand for equal health, education and employment chances for men and women. For example, Why women earn lower wages than men, although they are working in major export sectors in developing countries. In such situation, minimum wage law stimulates the demand for exports and for profits, so trade liberalization improves the status of women by enhancing their income and job opportunities (Braunstein 2000, Seguino 2000, Blecker and Seguino 2002, Busse and Spielmann 2006, Juhn et al. 2013). Becker, (1971) mentioned that gender wage gaps change the preferences of employers and firms move towards uneducated and lower cost labor. In an open economy, trade openness increases the competition among firms, and unskilled labor become costly for firms and hence trade openness reduces the

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[1] United Nations, Millennium Development Goals and beyond 2015
http://www.un.org/millenniumgoals/gender.shtml)
[2] World Trade Organization (WTO), commenced on January1, 1995 under Marrakesh Agreement, signed by 123 member nations.

gender wage gap for certain groups of women (Artecona and Cunningham, 2002). However, it is inclusive whether trade openess has direct impact on gender wage inequality (Fontana 2003, El-Hamidi 2008).

ii) Financial Development and Gender Inequality
The financial crisis has confirmed the links between financial development and gender inequality (Grebmer et al. 2009). Financial and economic crisis reduce international mobility of goods, services and human capital that diminish employment opportunities for all employees in export industries (World Bank 2009, Walby 2009). Financial development affects gender inequality via income, education and health effects. Development of the financial sector may contribute to women's income growth by making low-interest loans available for small as well as large entrepreneurial activities. This makes women more independent and productive once they take their destiny into their own hands (Claessens and Feijen, 2006). This implies that financial sector development improves gender distribution by enhancing employmnet opportunities/income-generating activities for women. Financial development makes education affordable for women. Financial services create more educational opportunities for women that subsequently contribute to their better future (Claessens and Feijen, 2006). Women's improved access to financial resources enable them for better socio-economic contribution in the society. Their financial freedom allows them to educate their daughters and produce more educated female labor force to assist the economy. Better educated women, better income-generating activities, and higher female income will diminish gender disparities in income. The financial sector may allocate financial services for women's health care. Financial development may encourage women to save more and provide them credit facility for having access to gynecological and obstetric services (Claessens and Feijen, 2006). As families become healthier, children are more able to participate at school. Children do not have to leave school in order to help sick family members and other constraints. Parents who are more educated also place a greater value on health. Healthier and more educated women own more assets and determine their own income; as a result, the gender income gap narrows (The World Bank, 1993).

iii) Pakistan and Gender Inequality
Pakistan is one of the developing countries where, gender inequality is criminally high. In 2013, Gender Inequality Index (GII)[3] ranked Pakistan as the second-worst country in the world. This is a source of grave concern for national and international organizations striving towards socio-economic equality. It also raises the questions for the government of Pakistan and policy makers because gender inequality limits a country's ability to achieve poverty alleviation and sustainable development goals (Blackden 1999, Leon and Walt 2001, Cleaver 2005, Deere et al. 2010). Women who are discriminated against on the basis of gender are called 'missing women' by Amartya Sen (1999). The panel study of Klasen (2009) found gender inequality a major hindrance to economic growth. Branisa et al. (2013) concluded that gender inequality has negative impacts on many of Pakistan's social indicators. Gender inequality in Pakistan has been observed in many sectors of its economy, such as employment, paid and unpaid work, resource distribution inside and outside the households, access to health, education, and the national power structure. Nilufer and Korkuk, (2004) noted that the division of labor will decide a

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[3] GII is an index that measures the gender gap and was introduced by United Nations Development Program (UNDP) in its Human Development Report of 2010.

society's gender productive and reproductive activities. Productive activities are income-generating and reproductive activities are not. Thus, in the developing countries like Pakistan, women's work remains invisible and unpaid. Moreover, women are less educated and undernourished. So altogether it makes strong case to investigate the determinants of gender inequality in Pakistan.

This study investigates the impact of financial development and trade openness on gender inequality in Pakistan in four ways. Firstly, we augment gender inequality function by adding financial development and trade openness as potential determinants of gender inequality. Secondly, we apply structural break unit root test and cointegration tests to check the unit root problem and cointegration among the variables. Thirdly, the long-run and short-run impact of trade openness and financial development is examined in relation to gender inequality. Fourthly, the causal relationship among the variables is investigated by applying the VECM Granger causality test. We find that economic growth reduces gender inequality. Financial development impairs gender distribution. Trade openness improves gender-based distribution and foreign direct investment lowers gender inequality. The causality test indicates the feedback effect between economic growth and gender inequality. The relationship between financial development and gender inequality is also bi-directional. The unidirectional causality runs from trade openness to gender inequality. Foreign direct investment causes gender inequality and gender inequality causes foreign direct investment in Granger sense.

II. Historical Background
i) Pakistan and Financial Development
Since the country's establishment in 1947 and until the 1980s, the government of Pakistan was concerned mainly with establishing the infrastructure to support its macroeconomic policies. The financial sector in Pakistan remained heavily controlled. Interest rates were set administratively and were usually negative in real terms. Monetary policy was conducted primarily through direct allocation of credit. The money market was under-developed and, bond and equity markets were virtually nonexistent. Commercial banks often had to lend priority sectors with little concern for the borrowing firm's profitability. Despite the opening of non-bank financial sector for private investment in the mid-1980s, public sector financial institutions held the bulk of assets, deposits, advances and investments in the entire financial sector at the end of 1980s (Zaidi, 2003). The inefficiencies and distortions of this financial system in the 1970s and 1980s created severe macroeconomic difficulties in Pakistan. Therefore, in order to overcome the financial system constraints, the government of Pakistan embarked on a wide range of stabilization and structural reform program and financial reforms were an important component of that broad program. Since then, financial reforms have remained the top priority of all macroeconomic policies of the country. Pakistan has taken notable efforts for the improvement of financial system. The objectives of these reforms were to create a level playing field for financial institutions and markets for instilling competition, strengthening their governance and supervision, and adopting a market-based indirect system of monetary, exchange and credit management for better allocation of financial resources. Reforms covered seven areas: financial liberalization, institutional strengthening, domestic debt, and monetary management, banking law, foreign exchange and capital market.

ii) Pakistan and Trade Liberalization

Pakistan adopted an import substitution policy soon after independence for protecting its infant industries. During 1960s, an industrial base was laid containing the rapid expansion of large-scale manufacturing industries. While the highly protected trade regime remained effective in this period, some additional policies were introduced to encourage industrial exports via overvalued exchange rate, export bonuses, preferential credit access to industries with export potential and automatic renewal of import licenses. Consequently, both industrial production and exports registered a reasonable increase during 1960s. However, industrial expansion did not continue at the same rate in 1970s. In fact, it suffered a setback in 1970s due to the nationalization policy. Although the government nationalized different types of industries which took three additional trade liberalization measures to encourage exports such as devaluation of the Pakistani Rupee by 57% in 1972, elimination of the export bonus scheme, and discontinuation of restrictive licensing scheme. This stimulated exports, especially of manufactured products.

Although trade policies were modified continuously in Pakistan, changes of particular significance were made after the formulation of the new trade policy in 1987. This trade policy led, inter alia, to a reduction in tariff slabs from 17% to 10% and introduction of a uniform tax in place of commodity-based sales taxes. The government focused on enhancing the role of private sector in the economy, increasing the competitiveness and efficiency of the domestic industrial sector, and promoting exports. The government took specific measures in pursuance of providing fiscal incentives such as tax holidays, tariff cuts and other profit-augmenting opportunities to the exporters. Moreover, the maximum tariff was reduced from 225% in 1986-87 to 70% in 1994-95. Pakistan has been the founding member of WTO and actively pursuing the free trade agreement SAFTA.[4] The number of custom duty slabs was reduced from 13% to 5% over the same period. Furthermore, the flexible exchange rate system introduced earlier was kept in effect during this decade. The introduction of such policies was also been witnessed in 2002-03, such as liberalization, deregulation, and reduction in the cost of doing business. These policies have placed equal emphasis on encouraging a stable macroeconomic framework in terms of inflation, interest rate and exchange rate. Further, they have concentrated on the promotion of export of services, which had not received their due attention in the past. In fact, they have made the promotion of services an integral component of trade openness.

Pakistan's trade liberalization reforms have received accolades from international businesses as well as multilateral financial institutions. Pakistan's recent reforms have been substantial (World Bank, 2010). Its trade regime is now one of the most open in South Asia. It has the lowest applied average tariff rates of the three largest South Asian economies: India, Pakistan and Bangladesh. Pakistan reached this position by reducing the number of tariff bands to 25%. Unlike Sri Lanka and Bangladesh, and indeed unlike most countries, Pakistan has not shied away from opening its agriculture sector. In addition, the government eliminated quantitative restrictions, regulatory duties and other tariffs and several other measures that restricted trade in the past. Finally, it reduced the number of statutory regulatory orders (SROs) and the exemptions granted under these orders. Ordinary custom duties are now the principal instrument of trade policy. Improvement in Pakistan's incentive structure and export environment has surely

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[4] South Asian Free Trade Agreement (SAFTA).

contributed to its strong export performance. The incentives have been given to increase exports such as concessionary financing, duty free imports of raw material under temporary importation scheme/Duty Tax Remission on Exports (DTRE), duty drawback scheme, concessions in duty/taxes on import of machinery and raw material of priority export sectors, development of export clusters (GoP, 2012). Through active trade diplomacy, the government is trying its best to get better market access for the local businesses in international markets by concluding Free Trade Agreements (FTAs) and Preferential Trade Agreements (PTAs) with different countries. Trade Development Authority of Pakistan (TDAP) is undertaking export promotional activities through trade exhibitions and delegations in the new markets of China, Hong Kong, Russia, Malaysia, Africa, America, and Eastern Europe.

II. Literature Review

The development economics literature offers number of studies on the gender-growth nexus but, less explores on the determinants of gender inequality and its causes in developing world (Lips, 2013). The reason for such unattended gap is inconclusive results of previous studies (Hall and Lawson, 2014). While looking at the macroeconomic factors, a major factor in reducing gender inequality is globalization (Chen et al. 2013), which increases investment liberalization and firm mobility. Globalization has made it easy for firms to shift their businesses and production from one nation to another with less transaction cost. Bronfenbrenner, (2000) mentioned that United States firms are moving into Mexico by using the North American Free Trade Agreement (NAFTA). The firms find a cheaper and unrestricted female labor force in Mexico as well as fewer unions, strikes, or demand for higher wages. Proponents of financial development and trade openness claim that gender-wage gap is reducing day by day (Weichselbaumer and Winter-Ebmer, 2005).[5]

For country case studies, Davin (2001) examines women's employment in China's export industries. He found that women in these industries earn higher wages by the standards of their rural home communities. Many of the women workers in EPZs, most of whom are young, are able to earn more in a month than a man in their home villages could make in a year. This is quite a decent wage compared to working for no wages on the family farm. Despite little job security, long hours, poor working conditions, and a lack of health and welfare benefits typically enjoyed by state sector workers, it is difficult to argue that these jobs make these women worse off, since they had little or no entitlement to these benefits and social protections as rural residents and workers. Artecona and Cunningham, (2002) examined the relationship between trade liberalization and the gender wage gap in Mexico. They found that in the manufacturing sector, the gender wage gap has increased, but wage discrimination is reduced because of trade liberalization[6]. Berik et al. (2003) tested the hypothesis that openness directly affects the wage gap between men and women in Taiwan and the Republic of Korea. They found that in the former, trade openness is positively associated with wage disparities, especially when openness is measured by the extent of manufacturing sector imports. They argued that import competition has worsened women's employment prospects in Taiwan, lowering their capacity to bargain for better wages so that they bear the "brunt of employers competitive cost-cutting efforts". In the

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[5] Baliamoune-Lutz (2007) reported that trade openness impairs gender income distribution in Morocco.
[6] Domínguez-Villalobos and Brown-Grossman, (2010) also found negative relationship between trade liberalization and wage gap.

Republic of Korea, reductions in export competitiveness have been associated with less gender wage discrimination, perhaps because of tighter restrictions on physical capital mobility and other public policies. Mishra and Kumar, (2005) noted that trade openness increases the firms' productivity which increases employment demand for unskilled labor in India. They further reported that trade openness increases the relative income of unskilled labor especially for women and improve gender income distribution. Meyer, (2007) used 55 countries data to analyze the impact of trade openness on gender wage inequality and found that trade openness increases earnings share for women and reduces gender inequality.

Menon and Rodgers, (2009) reported that the wage gap between men and women in the manufacturing industries of India is narrowing under the influence of competitive forces. The public policy in this regard focuses on deregulation and tariff reductions, which creates an atmosphere of competition among domestic and foreign firms in India. There are many reasons why educational inequality matters. For example, women's educational attainment relative to men lengthens their lives and increases their bargaining power inside and outside households. This educational attainment enables women to negotiate for fairdistribution of family resources and theytake those steps which would increase their children's well-being. Moreover, education for women enables them to control fertility and invest more resources in each child's health and education (Blumberg 1988, Hoddinott and Haddad 1995, Quisumbing and Maluccio 2000). Gaddis and Pieters (2012) examined the relationship between trade liberalization and female labor force participation in Brazil. They noted that trade reforms encouraged female labor force participation via generating employment opportunities for women and improved their earnings. Juhn et al. (2013) also reported that trade liberalization via tariff reductions encourage to generate opportunities for females and increase their wage bills which improve gender income distribution. Lastly, Chen et al. (2013) examine the nexus between globalization and gender inequality for the Chinese economy. They found that globalization encourages women by generating employment opportunities and lowering gender inequality.

Shahbaz, (2012) argued that the exclusion of relevant variables such as financial development while investigating the relationship between trade openness and gender inequality may produce inconclusive empirical findings. Financial development enables firms to shift production from one place to another and from one country to another for getting higher profits. A particularly salient feature of the era of financial development is that wealth holders are now able to travel the globe in search of the highest rate of returns. Countries therefore end up in a bidding war by raising interest rates and lowering taxes—to attract much-needed foreign capital (Thorbecke, 1999). Apart from the negative effect on government budgets of tax exemptions, the tendency for interest rates to rise is particularly damaging, especially when coupled with monetary policy aimed at keeping inflation low (Carpenter and Rodgers, 2004). The low inflation strategy adopted by central banks in many developing countries is seen as a means to attract foreign capital since asset-holders care about the real rate of return on investment (Rodgers, 2008). It has recently been suggested that inflation targeting, or more generally, disinflationary policy, limits women's employment opportunities (Thorbecke 1999, Carpenter and Rodgers 2004, Rodgers 2008). Financial development helps investors and producers to adopt new and improved technologies, the developing countries have agriculture as their biggest sector in term of income share and labor force participation. Financial development depends on mobilized savings and

easy availability of credit, so financial development can improve health and education of the farmers by covering their financial needs for their agricultural business (McKinnon, 1973). Greenwood and Jovanovich (1990), Bannerjee and Newman (1993) and, Galor and Zeira (1993) mentioned that financial development reduces inter-gender income inequality. Moreover, Greenwood and Jovanovich (1990) concluded that there is an inverted U-shaped relationship between financial development and inter-gender income inequality.

MkNelly and Dunford, (1999) explored the relationship between financial development and women's empowerment as well as gender inequality in Bolivia. They noted that financial services help women to increase their self-confidence and involvement in the society, increase their earnings and improve gender income distribution. Beck et al. (2004) examined the contribution of financial development in reduction in income inequality and poverty. They observed that financial development improves income distribution by promoting economic growth which generates employment opportunities for skilled as well as unskilled labor. So, growth in per capita income reduces both income inequality and poverty. In contrast, Rosner (2010) reported that financial development reduces poverty by increasing money and deposit opportunities for poor individuals rather allocation of credit to the poor segments of population. Jalilian and Kirkpatrick, (2005) revealed that financial development improves income distribution through a growth-enhancing effect after threshold level of economic development in developing economies. Claessens and Feijen, (2006) explored the association between financial development and education, gender equality, and health using data of 117 developed and developing economies. In developing countries, financial development is positively linked with primary and tertiary enrolment, persistence to stay in school and female labor force participation which in resulting increase life expectancy as well as improves gender income distribution. Furthermore, financial development only improves gender income distribution, education and health in developed countries. In a study of rural Cameron, Kendo (2008) examined the association between financial development and inter-gender inequalities. The empirical evidence indicated that financial development improves the inter-gender income distribution but nonlinear relationship financial development and inter-gender income inequality is inverted U-shaped i.e. Kuznets curve. Seguino (2009) exposed that financial development leads industrialization that improves gender income distribution via employment generating opportunities both for males and females as well as stimulating economic growth.[7] Rosner, (2011) used data for developed and developing countries to explore the relationship between financial development, education, health and gender equality. The results show that financial development lead to education and health that further leads to gender income distribution. Onuonga, (2014) explored the relationship between gender income inequality, financial development and economic growth in Kenya. Their empirical evidence indicated that the variables are cointegrated for long-run relationship. They noted that increase in gender income inequality impairs economic growth but financial development increases economic growth.[8]

In Pakistan, Naeem and Hyder, (2006) explored the relationship between trade openness (exports + imports) and gender inequality. They found that economic growth and ratio of girls' schools

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[7] Singh and Zammit (2002) reported that deflation impairs gender income inequality. The reason is that more women than men lose their jobs during recessions.

[8] Uddin et al. (2014) reported that financial development reduces poverty by enhancing per capita income.

boys' schools is negatively linked to gender inequality. Their analysis also indicated that exports and imports improve gender income distribution. Shahbaz et al. (2007) examined the impact of economic growth and financial development on rural-urban income inequality. They found that the relationship between economic growth and rural-urban income inequality is an inverted U-shaped. Furthermore, their analysis indicated that financial development initially increases rural-urban income inequality but declines it after threshold level of financial development (inverted U-shape). Shahbaz and Aamir (2008) investigated the relationship between foreign direct investment and income inequality and found that foreign direct investment worsens income inequality.[9] Siddiqui, (2009) described the impact of trade liberalization on gender inequality. The empirical evidence indicated that trade liberalization generated more unskilled jobs for females than for males and increased the real wages for women which improved gender income distribution. In poor households, women are unfavorably benefited by trade liberalization due to heavy workload as well as deteriorating capabilities and relative income poverty is increased. Shahbaz (2010) discussed the relationship between economic growth and income inequality and reported that relationship between economic growth and income inequality is an inverted U-shaped as well as S-shaped. Shahbaz and Islam (2011) explored the relationship between financial development and income inequality. They concluded that financial development improves income distribution but trade openness worsens it. Pervaiz et al. (2011) examined the impact of gender inequality on economic growth using production function and found that gender inequality impairs economic growth. Sajid and Ullah (2014) utilized data of D-8 countries to examine the relationship between trade openness and gender employment-gap. They noted that trade openness improves the situation of employment for women showing that trade liberalizing policies are encouraging the female labor force participation. Shahbaz et al. (2015) found that international remittances and income inequality has positive impact on economic growth, but the feedback effect is found between international remittances and income inequality.[10]

III. Theoretical Framework and Model Construction

Following the empirical literature, several factors affect gender income inequality. The main determinants of gender inequality are imports, exports, income, and education. For example, Pasha (1994) found a positive relationship between female school enrollment and economic growth in Pakistan. Pasha, (1999) also found that income per capita enables households to invest in female education and health, both of which improve their productivity. Seguino (2000) investigated the relationship between trade openness, female labor force participation, and female wages. Blinder, (1973) and Oaxaca, (1973) provided the theoretical background on how financial development impacts inter-gender income inequality. Following Blinder (1973), Oaxaca (1973), Pasha (1994), and Seguio (2000) the general form of gender inequality function is modeled as follows:

$$G_t = \alpha_1 Y_t^{\beta_1} F_t^{\beta_2} O_t^{\beta_3} I_t^{\beta_4} e^{t+u_{1t}} \qquad (1)$$

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[9] Kalim and Shahbaz, (2009) indicated that foreign remittances reduces poverty in Pakistan.
[10] Rehman and Shahbaz (2014) noted the feedback effect between financial deepening and poverty reduction.

where, G_t is gender inequality, Y_t is economic growth, F_t is financial development, O_t is trade penness, I_t is foreign direct investment and e_t s time invariate error term. We have converted non-linear specification into log-linear specification after transforming all the series into to logarithmic form. Shahbaz, (2012) argues that the log-linear specification is suitable for efficient and consistent empirical evidence. The empirical equation of gender inequality function is modeled as follows:

$$\ln G_t = \alpha_1 + \alpha_2 \ln Y_t + \alpha_3 \ln F_t + \alpha_4 \ln O_t + \alpha_5 \ln I_t + \mu_t \qquad (2)$$

$\ln G_t$ is natural-log gender inequality index, $\ln Y_t$ is natural-log of real GDP per capita (measures economic growth), $\ln F_t$ is natural-log of financial development (measures by real domestic to private sector per capita), O_t is natural-log of trade penness (exports + imporst) per capita, I_t is natural-log of real foreign direct investment per capita and μ_t is error term.

The present study covers the period of 1972-2013. The world development indicators (CD-ROM, 2014) are used to collect data on exports (in local currency), imports (in local currency) and foreign direct investment (as share or GDP). The data on domestic credit to private sector (as share of GDP) and real GDP per capita is obtained from economic survey of Pakistan (GoP, 2014).[11] The data on gender income inequality is borrowed from Nadeem and Haider, (2006).[12] Nadeem and Haider, (2006) followed the methodlogy developed by UNDP, (1995) for constructing the human development index using inocme, education and health sub-indices. Due to data unability on wage differences in Pakistan, Nadeem and Haider, (2006) used labor market indicators (demand and supply side indiactors) to construct the gender inequality index. These inidactors are primary enrolment, secondary enrollment, number of employed teachers, adult literacy rate, crude death rate, life expectancy, mortality rate in 1–4 years old as well as labour force participation rate[13]. They have generated three sectoral indices such as education attainment index, survival index and labor participation index. Further, they used equal weigtage scheme and generated index of gender inequality[14].

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[11] All the series are available in nominal terms and we have converted into real terms by dividing all the series on consumer price index after converting domestic credit to private sector and foreign direct inesmnet into local currency except gender inequality index. Later on, total population series is used to transform the variables into per capita terms except gender income inequality.

[12] They have provided data over the period of 1972-2005 and we have extended the data to 2006-2013 using their method.

[13] $G_i = \left[\dfrac{S_W}{100} + \dfrac{S_M}{R_i} \right]$ where G_i is gender inequality, S_W is share of women in relevant population, S_M is men share in relevant population, R_i is ratio of magnitude of men indiactor to magnitude of women inidactor. G_i and R_i move in same direction. If $G_i > 0$ then $R_i > 0$ and vice versa. The value of index expressed in percentage and higher value of G_i show high gender inequality and gender inequality is low if vaue G_i is low.

[14] The weight secheme for composite idex is describdex as: *primary enrollment (1/12), secondary enrollment (1/12), adult literacy (1/12), employed teachers (1/12), crude death rate (1/9), life expectancy (1/9), mortality rate (1-4) years old (1/9), labour force participation (1/3) (Nadeem and Haider, 2006).*

Figure-1: Macroeconomic Gender Dynamics in Pakistan
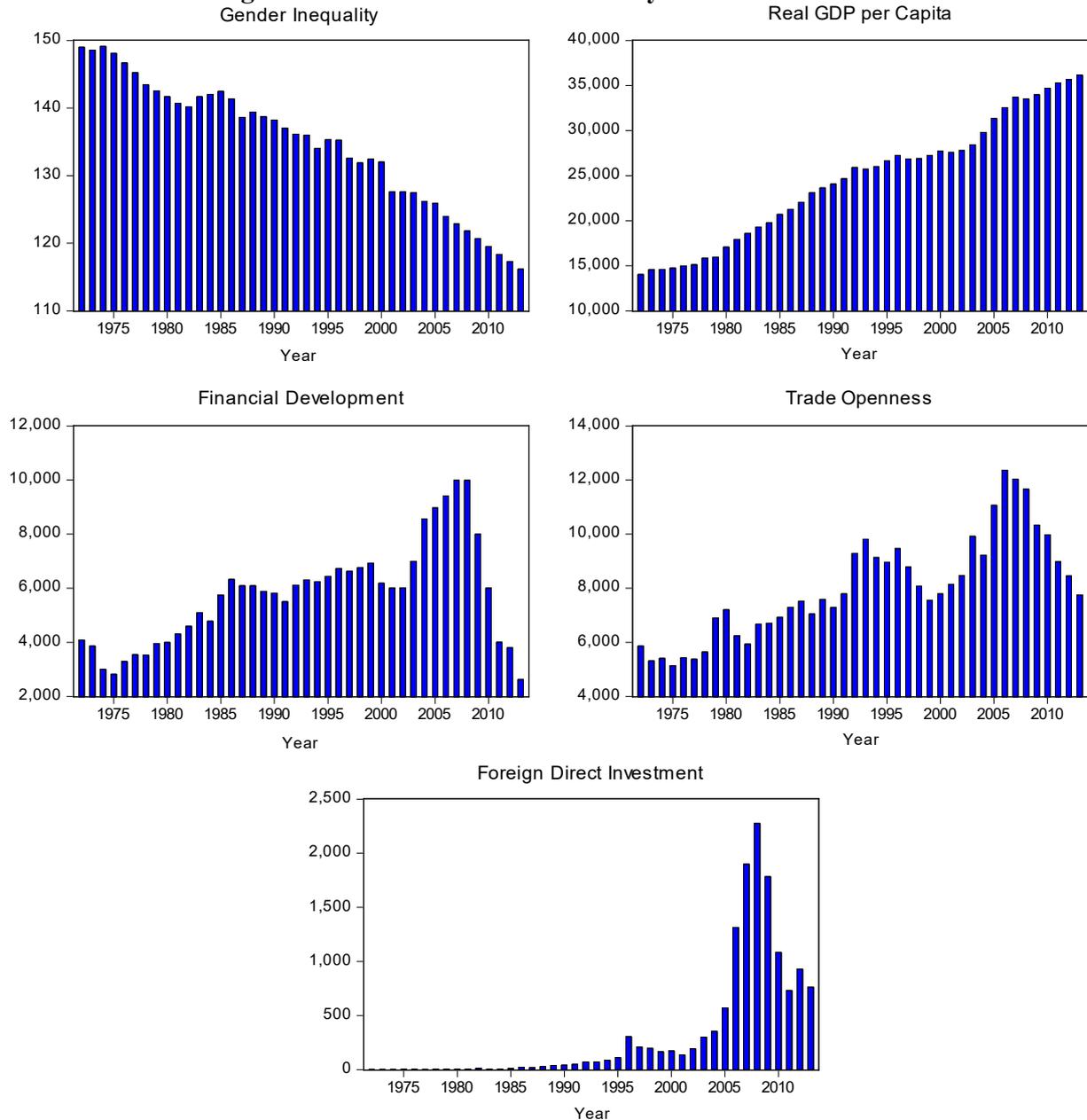
IV. Econometric Methodology

Time series data contains unit root problem and regression results become spurious (Nelson and Ploser, 1982). Moreover, for testing the cointegration among the variables, examining the stationarity properties of variablesis necessary and sufficient condition. In existing applied economics literature, researchers are busy to handle the unit root problem by applying various unit root tests such as Dickey-Fuller (1979), Augmented Dickey-Fuller (1980), Perron (1990), Zivot and Andrews (1992), and Phillips-Perron (1988). We use Augmented Dickey-Fuller (1980), Phillips-Perron (1988), and Zivot and Andrews (1992) to test the stationarity properties of the variables.

Among the available cointegration tests are Engle-Granger (1987), Johansen (1991, 1992), Johansen and Juselious (1990), Perron (1989, 1997), and Leybourne and Newbold (2003). These cointegration tests provide inefficient and inconsistent empirical results due their low explanatory power and all need that the variables should be integrated at 1(I). This issue is handled by autoregressive distributive lag (ARDL) bounds testing approach developed by Pesaran et al. (2001). The bounds testing approach is suitable for small data sets. This test is applicable if variables have a mixed order of integration. The bounds testing approach is applied if the variables are found to be stationary at level as well as first difference. The long-run as well as short-run empirical evidence is obtained from unconditional error correction (UECM) version of the ARDL. Lastly, the ARDL bounds testing approach provides information either cointegration exists or does not in the presence of structural break arising in the series. We apply the ARDL bound testing approach to examine the cointegration among gender income inequality, economic growth, financial development, trade openness, and foreign direct investment. The empirical equation of autoregressive distributed lag model is given as follows:

$$\Delta \ln G_t = \beta_1 + \beta_2 t + \beta_4 \ln G_{t-1} + \beta_4 \ln F_{t-1} + \beta_5 \ln Y_{t-1} + \beta_6 \ln O_{t-1} + \beta_7 \ln I_{t-1}$$
$$+ \sum_{h=1}^{p} \beta_h \Delta \ln G_{t-h} + \sum_{j=0}^{p} \gamma_j \Delta \ln F_{t-j} + \sum_{k=0}^{p} \phi_k \Delta \ln Y_{t-k} + \sum_{m=0}^{p} \phi_m \Delta \ln O_{t-m} + \sum_{n=0}^{p} \phi_n \Delta \ln I_{t-n} + u_{it} \quad (3)$$

After selecting the appropriate lag order, we estimate the F-statistic just to compare with critical bounds (upper and lower critical bounds). If calculated F-statistic crosses the upper critical bounds then we may conclude that cointegration exists between the variables. There is no cointegration if lower critical bound is more than computed F-statistic. The cointegration decision is questionable if calculated F-statistic lies between upper and lower critical bounds.

After confirming cointegration among the variables, we apply Granger causality test to determine the causality among the variables. For this purpose, the vector error correction method (VECM) can be developed as follows:

$$\begin{bmatrix} \Delta \ln G_t \\ \Delta \ln Y_t \\ \Delta \ln F_t \\ \Delta \ln O_t \\ \Delta \ln I_t \end{bmatrix} = \begin{bmatrix} b_1 \\ b_2 \\ b_3 \\ b_4 \end{bmatrix} + \begin{bmatrix} B_{11,1} & B_{12,1} & B_{13,1} & B_{14,1} & B_{15,1} \\ B_{21,1} & B_{22,1} & B_{23,1} & B_{24,1} & B_{25,1} \\ B_{31,1} & B_{32,1} & B_{33,1} & B_{34,1} & B_{35,1} \\ B_{41,1} & B_{42,1} & B_{43,1} & B_{44,1} & B_{45,1} \\ B_{51,1} & B_{52,1} & B_{53,1} & B_{54,1} & B_{55,1} \end{bmatrix} \times \begin{bmatrix} \Delta \ln G_{t-1} \\ \Delta \ln Y_{t-1} \\ \Delta \ln F_{t-1} \\ \Delta \ln O_{t-1} \\ \Delta \ln I_{t-1} \end{bmatrix} + \dots + \begin{bmatrix} B_{11,m} & B_{12,m} & B_{13,m} & B_{14,m} & B_{15,m} \\ B_{21,m} & B_{22,m} & B_{23,m} & B_{24,m} & B_{25,m} \\ B_{31,m} & B_{32,m} & B_{33,m} & B_{34,m} & B_{35,m} \\ B_{41,m} & B_{42,m} & B_{43,m} & B_{44,m} & B_{45,m} \\ B_{51,m} & B_{52,m} & B_{53,m} & B_{54,m} & B_{55,m} \end{bmatrix} \quad (6)$$

$$\times \begin{bmatrix} \Delta \ln G_{t-1} \\ \Delta \ln Y_{t-1} \\ \Delta \ln F_{t-1} \\ \Delta \ln O_{t-1} \\ \Delta \ln I_{t-1} \end{bmatrix} + \begin{bmatrix} \zeta_1 \\ \zeta_3 \\ \zeta_3 \\ \zeta_4 \\ \zeta_5 \end{bmatrix} \times (ECM_{t-1}) + \begin{bmatrix} \mu_{1t} \\ \mu_{2t} \\ \mu_{3t} \\ \mu_{4t} \\ \mu_{5t} \end{bmatrix}$$

Here $(1 - L)$ is lagged operator and for lagged error correction term ECM_{t-1}, which is generated from the long-run cointegration. The long-run causality is found by significance of coefficient of lagged error correction term using t-test statistic. The existence of a significant relationship in first differences of the variables provides evidence on the direction of short-run causality. The joint χ^2 statistic for the first differenced lagged independent variables is used to test the direction of short-run causality among the variables. For example, $B_{12,i} \neq 0 \forall_i$ shows that economic growth Granger causes gender inequality and economic growth is the Granger of cause of gender inequality if $B_{11,i} \neq 0 \forall_i$.

V. Empirical results and Discussion

Table-1 presents the descriptive statistics and pair-wise correlation among the variables. We find that gender inequality, economic growth, financial development, trade openness and foreign direct investment are normally distributed confirmed by Jarque-Bera statistics. The findings of pair-wise correlation analysis show that gender inequality has a positive correlation with economic growth. Financial development and gender inequality are negatively correlated. The correlation between trade openness and gender income inequality is also found negative. Foreign direct investment is inversely correlated with gender inequality. However, economic growth is positively correlated with financial development, trade openness and foreign direct investment. Financial development has positive correlation with trade openness and foreign direct investment. The correlation between trade openness and foreign direct investment is positive. The overall results of descriptive statistics confirm the normal distribution of selected data and corelation matrix reveals that all underlying macroeconomic variables excep economic growth curtail gender inequality. The data is statistically ready for further econometric analysis.

Table-1: Descriptive Statistics and Pair-wise Correlation

Variables	$\ln G_t$	$\ln Y_t$	$\ln F_t$	$\ln O_t$	$\ln I_t$
Mean	4.9074	10.0488	8.6278	8.9602	3.7802
Median	4.9169	10.1337	8.7021	8.9481	4.0976
Maximum	5.0048	10.4710	9.2101	9.4231	7.7297
Minimum	4.7738	9.5491	7.9453	8.5452	-2.5680
Std. Dev.	0.0654	0.2845	0.3229	0.2406	2.4503
Skewness	-0.4177	-0.3442	-0.2299	0.0240	-0.3407
Kurtosis	2.1718	1.8965	2.4646	2.1639	2.5310
Jarque-Bera	2.3066	2.8192	0.8302	1.1687	1.1404
Probability	0.3155	0.2442	0.6602	0.5574	0.5653
$\ln G_t$	1.0000				
$\ln Y_t$	-0.2103	1.0000			
$\ln F_t$	0.1218	0.2963	1.0000		
$\ln O_t$	-0.0774	0.1701	0.3808	1.0000	
$\ln I_t$	-0.1135	0.0171	0.0670	0.2418	1.0000

Table-2: Unit Root Analysis

Variables	ADF Test		PP Test	
	T-statistic	P.value	T-statistic	P.value
$\ln G_t$	-1.4398 (1)	0.8392	-1.4398 (3)	0.8293
$\ln Y_t$	-1.2500 (2)	0.8815	-1.3078 (3)	0.8712
$\ln F_t$	-1.4915 (3)	0.8150	-1.0311(3)	0.9267
$\ln O_t$	-2.8102 (2)	0.2026	-2.6915(3)	0.2441
$\ln I_t$	-3.0417 (1)	0.1315	-2.6498(3)	0.2450
$\Delta \ln G_t$	-5.9436 (2)***	0.0001	-7.0611 (3)***	0.0000
$\Delta \ln Y_t$	-4.7744 (3)***	0.0024	-4.8242 (3)***	0.0021
$\Delta \ln F_t$	-7.9361 (1)***	0.0000	-5.9813 (3)***	0.0004
$\Delta \ln O_t$	-4.2093 (3)***	0.0104	-5.3081(3)***	0.0006
$\Delta \ln I_t$	-5.1921 (2)***	0.0008	-11.0197(3)***	0.0000
Note: *** indicates significant at 1% level of significance. Lag length of variables is shown in small parentheses.				

The study plans to incorpoprate cointegrtaion test to determine long-run relationship among the variables. However, time series econometrics literature necessitates to test the stationary property using unit root test before applying cointegration test. Otherwise, problem of spurous regression may accur due to unit root in the series. Hence, we have applied ADF and PP unit root tests and the results of both unit root tests are presented in Table-2. We note that none of the variables are stationary at level with intercept and trend. After taking the first difference, gender inequality, economic growth, financial development, trade openness and foreign direct investment are stationary. This shows that gender inequality, economic growth, financial development, trade openness and foreign direct investment are integrated at I(1). However, we note that ADF and PP fail to provide exact information about the integrating properties of the variables due to their low explanatory power. These unit root tests also ignore information about structural breaks in the series and distort the results. We have therefore applied newly emerged Zivot and Andrews (1992) unit root test that accommodates single unknown structural break in the series. The results of Zivot and Andrews (1992) unit root test are reported in Table-3. We note that the series is found to be non-stationary at level in the presence of structural breaks in the series. The variables are stationary at first difference with intercept and trend.This corroborates that gender inequality, economic growth, financial development, trade openness and foreign direct investment are integratedat I(1).

Table-3: Zivot-Andrews Structural Break Trended Unit Root Test

Variable	At Level		At 1ˢᵗ Difference	
	T-statistic	Time Break	T-statistic	Time Break
$\ln G_t$	-3.808 (2)	1995	-7.122 (1)***	1986
$\ln Y_t$	-3.405 (1)	1993	-5.752 (3)***	1993
$\ln F_t$	-3.013 (1)	2007	-5.984 (1)***	2003

$\ln O_t$	-3.521 (3)	1997	-6.264(1)***	2005
$\ln I_t$	-6.659 (2)	1977	-7.221(1)***	2006

Note: *** represents significant at 1% level of significance. Lag order is shown in parentheses.

After confirming the integration properties of the variables, we investigate the cointegration among the variables by applying the Bayer and Hanck (2013) cointegration approach. First, we use gender inequality as dependent variable as a function of four key macroeconomic variables i.e. financial development, economic growth, trade openness, and foreign direct investment. The calculated values of EG-JOH (16.236) and EG-JOH-BO-BDM (33.880) are greater than the Fisher critical value of EG-JOH (15.845) and EG-JOH-BO-BDM (30.774). This confirms cointegration among the variables. A similar conclusion is drawn based on empirical evidence once we used financial development, economic growth and foreign direct investment as dependent variables. The hypothesis of cointegration is accepted as we treated trade openness as dependent variable. This confirms the presence of four cointegrating vectors which validates the presence of cointegration among the variables. It may be concluded that gender inequality, financial development, economic growth, trade openness, and foreign direct investment possess long-run equilibrium relationship in case of Pakistan. In other words, the macroeconomic variables of economic growth, financial development, trade openness and foreign direct investment influence gender inequality in the long-run path.

Table-4: The Results of Bayer and Hanck Cointegration Analysis

Estimated Models	EG-JOH	EG-JOH-BO-BDM	Lag Order	Cointegration
$G_t = f(F_t, Y_t, O_t, I_t)$	16.236***	33.880***	2	Yes
$F_t = f(G_t, Y_t, O_t, I_t)$	16.398	39.459***	2	Yes
$Y_t = f(G_t, F_t, O_t, I_t)$	16.485***	33.147***	2	Yes
$O_t = f(G_t, F_t, Y_t, I_t)$	17.692***	29.564	2	No
$I_t = f(G_t, F_t, Y_t, O_t)$	20.328***	51.624***	2	No

Note: *** represents significant at 1%level. Critical values at 1% level are 15.845 (EG-JOH) and 30.774 (EG-JOH-BO-BDM). Lag length is based on minimum value of AIC[15].

Although, Bayer and Hanck (2013) provides an efficient and a consistent cointegration approach compared to traditional ones, the application of Bayer and Hanck (2013) becomes useless if the series contains a structural break. In this situation, the ARDL bounds testing approach is suitable for examining cointegration amid the variables in the presence of single break in the series. The computation of ARDL F-statistic for bounds testing is sensitive to lag length selection. We chose Akaike Information Criterion (AIC) because of its superior explanatory power (Shahbaz et al. 2015). The value of ARDL F-test varies at various lag order of the variables. The results of the bounds testing cointegration approach are described in Table-5. We found that calculated ARDL F-statistic exceeds the upper critical bounds at 1%, 5% and 10% levels respectively as we used gender inequality, economic growth, financial development and foreign direct investment as

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[15] We have used the long-linear specification for the variables while doing cointegration analysis using Bayer and Hanck, (2013) cointegration framework.

dependent variables. This validates the presence of four cointegrating vectors in the model which substantiates the existence of long-run relationship among the variables. This shows that the results of bounds testing are robust in the presence of structural breaks occurring in the series with combined cointegration approach developed by Bayer and Hanck, (2013). The results also indicate the absence of serial correlation and the presence of normal distribution of residual terms. Furthermore, bounds testing models are well-specified confmed by Ramsey Reset test.

Table-5: The Results of ARDL Cointegration Test

Bounds Testing to Cointegration				Diagnostic tests		
Estimated Models	Optimal lag length	Structural Break	F-statistics	χ^2_{NORMAL}	χ^2_{RESET}	χ^2_{SERIAL}
$G_t = f(F_t, Y_t, O_t, I_t)$	2, 1, 2, 2, 2	1995	10.464***	1.1409	[1]: 0.0515	[1]: 1.6761
$F_t = f(G_t, Y_t, O_t, I_t)$	2, 2, 1, 1, 2	1993	11.396***	1.0387	[2]: 4.0231	[2]: 1.2070
$Y_t = f(G_t, F_t, O_t, I_t)$	2, 2, 2, 1, 2	2007	6.440**	0.0702	[2]: 0.1806	[1]: 0.4919
$O_t = f(G_t, F_t, Y_t, I_t)$	2, 2, 2, 2, 1	1997	3.297	2.8584	[2]: 0.5925	[2]: 2.6018
$I_t = f(G_t, F_t, Y_t, O_t)$	2, 1, 2, 1, 2	1977	5.877*	1.3286	[1]: 1.5840	[1]: 2.6535
Significant level	Critical values (T= 40)[#]					
	Lower bounds $I(0)$	Upper bounds $I(1)$				
1 per cent level	7.527	8.803				
5 per cent level	5.387	6.437				
10 per cent level	4.477	5.420				

Note: The asterisks ***, ** and * denote the significant at 1, 5 and 10% levels, respectively. The optimal lag length is determined by AIC. [ ] is the order of diagnostic tests. # Critical values are collected from Narayan (2005).

The cointegration analysis only communicates the information whether the selected variables holds long association or do not. However, the long-run and short-run analyses using error correction term renders the long-run and short-run elasticities of dependant varaible with respect to independant variables. These results provide exact information that how much each independant variable brings variation in dependant variable both in short-run and long-run. The positive and negative signs show the direction of change. So, the next step is to examine the long-run impact of economic growth, financial development, trade openness, and foreign direct investment on gender inequality; results are reported in Table-6. The results indicate that economic growth is negatively and significantly linked with gender inequality. All else being equal, a1% increase in economic growth improves gender distribution by 0.0627%. This indicates that Pakistan's economic growth generated more employment opportunities for females than males and lowers gender inequality. This finding is consistent with Nadeem and Haider (2006) who found that economic growth delines gender inequality. Financial development has positive and significant effect on gender inequality. A 1% increase in financial development contributes to gender inequality by 0.1309%. Our finding is supported by Blinder, (1973) and Oaxaca, (1973) who reported that gender equality is hindered by financial development. The effect of trade openness on gender inequality is negative and statistically significant. A 1% increase in trade openness decreases gender inequality by 0.0712%. This finding is also consistent with Nadeem and Haider, (2006) who reported that exports and imports improve gender distribution by generating more jobs for females than males. There is a negative and significant relationship between foreign direct investment and gender inequality. By keeping

other things constant, a 1% increase in foreign direct investment reduces gender inequality by 0.0108%. This empirical evidence is consistent with Aguayo-Tellez, (2011) who argued that foreign direct investment improves gender inequality in developing economies. Aguayo-Tellez, (2011) exposed that in developing countries, females are paid less and foreign investors prefer to hire cheap labor. In such situation, there are more employment opportunities for females, which increase their per capita income and decreases gender disparities. The effect of dummy variable on gender inequality is negative and significant. This dummy variable shows the implementation of structural adjustment program which has negative and significant impact on gender inequality. This which shows that structural adjustment program lower gender inequality by opening employment opportunities for women. Kemal, (1994) argued that other issues interfere with gender inequality such as non-development expenditures, high inflation, huge fiscal deficit, limiting the wage rate, and high ratio of indirect tax in tax revenues.

We have inserted squared term of financial development and trade openness in linear model to examine the non-linear relationship between financial development and gender inequality, and between trade openness and gender inequality. The linear and nonlinear terms of financial development supports the inverted U-shaped relationship. This shows that a 1% increase in financial development leads gender inequality by 1.1403% and negative sign of squared term confirms the delinking of gender inequality and financial development at higher level of financial development. It reveals that financial development increases gender inequality initially but declines after threshold level of financial sector development. The relationship between trade openness and gender inequality is inverted U-shaped. Trade openness is positively linked with gender inequality and improves gender distribution after threshold level of trade openness.

Table-6: Long-run Analysis

Dependent Variable = $\ln G_t$						
Variables	Coefficient	T-statistic	Coefficient	T-statistic	Coefficient	T-statistic
Constant	6.3603*** [0.4430]	14.3553	0.1862 [1.6760]	0.1111	0.6073 [0.3742]	1.6228
$\ln Y_t$	-0.1309** [0.0527]	-2.4809	-0.1403*** [0.0427]	-3.2810	-0.1487*** [0.0446]	-3.3318
$\ln F_t$	0.0627** [0.0197]	3.1753	1.4101*** [0.3855]	3.6572	0.0616*** [0.0178]	3.4577
$\ln F_t^2$	....	....	-0.0874*** [0.0225]	-3.4877	....	....
$\ln O_t$	-0.0712* [0.0382]	-1.8623	-0.0142 [0.3379]	-0.4226	2.6917*** [0.8549]	3.1483
$\ln O_t^2$	....	....	....	....	-0.1508*** [0.0469]	-3.2135
$\ln I_t$	-0.0108** [0.0052]	-2.0694	-0.0152*** [0.0042]	-3.6268	-0.0147*** [0.0043]	-3.4228
D_{1995}	-0.0285** [0.0101]	-2.7993	-0.0228** [0.0103]	-2.2102	-0.0226** [0.0099]	-2.2760
R^2	0.9156		0.9463		0.9441	
F-Statistic	92.2440***		116.4956***		111.4872**	

|					
Prob. Value	0.0000		0.0000		0.0000	
Diagnostic Analysis						
Test	F-statistic	Prob. value	F-statistic	Prob. value	F-statistic	Prob. value
χ^2 NORMAL	1.3333	0.5134	1.0934	0.5788	1.5047	0.4712
χ^2 SERIAL	0.1972	0.6098	0.2544	0.5678	0.1150	0.7008
χ^2 ARCH	1.2950	0.2624	2.5547	0.1187	2.1044	0.1375
χ^2 HETERO	0.4618	0.7631	0.8754	0.4709	0.8093	0.5514
χ^2 REMSAY	0.5430	0.8011	1.0918	0.7645	1.1916	0.6678
Note: ***, ** and * show significance at 1%, 5% and 10% levels respectively. [] shows standard error.						

The results of short-run dynamics are shown in Table-7. We find that economic growth is positively and significantly related with gender inequality. Financial development has positive and insignificant impact on gender inequality. Trade openness negatively affects gender inequality. Foreign direct investment has negative but insignificant impact on gender inequality. The negative and statistically significant estimates of lagged error term (ECM$_{t-1}$) i.e. -0.6664 corroborates our established long-run relationship between the variables. The coefficient of lagged error term is statistically significant at 1% level. The structural adjustment program on gender inequality is negative but statistically insignificant. This shows that short run deviations are corrected by 66.64% towards long-run equilibrium path each year and it will take 18 months to catch equilibrium path. Additionally, the short-run model has passed assumptions of classical linear regression model. The short-run model is free from problem of non-normality of error term. The serial correlation is not present in model. There is no empirical evidence of ARCH and white heteroskedasticity. The specification of short-run model is well formulated and confirmed by the Ramsey Reset test. The stability of long-run and short-run is also tested by using CUSUM and CUSUMsq. The results of CUSUM and CUSUMsq are shown in Figure-2 and 3. The tests like cumulative sum (CUSUM) and the cumulative sum of squares (CUSUMsq) show the stability of long-run and short-run parameters. The plots of both CUSUM and CUSUMsq of squares statistics are well and within the critical bounds. This ensures the stability of long-run and short-run parameters.

Table-7: Short-Run Analysis

| **Dependent Variable = $\Delta \ln G_t$**			
Variables	Coefficient	T-statistic	P. value
Constant	-0.0075*** [0.0023]	-3.1682	0.0034
$\Delta \ln F_t$	0.0656 [0.0894]	0.7338	0.4684
$\Delta \ln Y_t$	0.0197** [0.0079]	2.4717	0.0190
$\Delta \ln O_t$	-0.0309** [0.0174]	-1.7731	0.0857
$\Delta \ln I_t$	-0.0021 [0.0018]	-1.1700	0.2506
D_{1995}	-0.0024 [0.0030]	-0.8028	0.4280

ECM_{t-1}	-0.6664*** [0.1501]	-4.4370	0.0001
R^2	0.1954		
F-Statistic	15.5550***		
D. W Test	2.1247		
Diagnostic Analysis			
Test	F-statistic	Prob. value	
χ^2 NORMAL	4.0332	0.1331	
χ^2 SERIAL	0.4132	0.6651	
χ^2 ARCH	0.4243	0.5189	
χ^2 HETERO	0.5141	0.7636	
χ^2 REMSAY	0.4539	0.5467	
Note: *** and ** show significance at 1%and 5% levels respectively. [] shows standard error.			

Figure-2: Plot of Cumulative Sum of Recursive Residuals
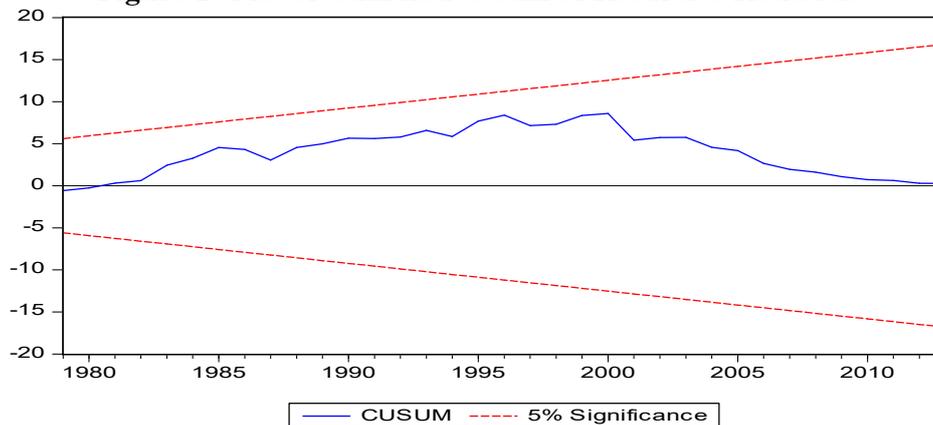
The straight lines represent critical bounds at 5% significance level

Figure-3: Plot of Cumulative Sum of Squares of Recursive Residuals
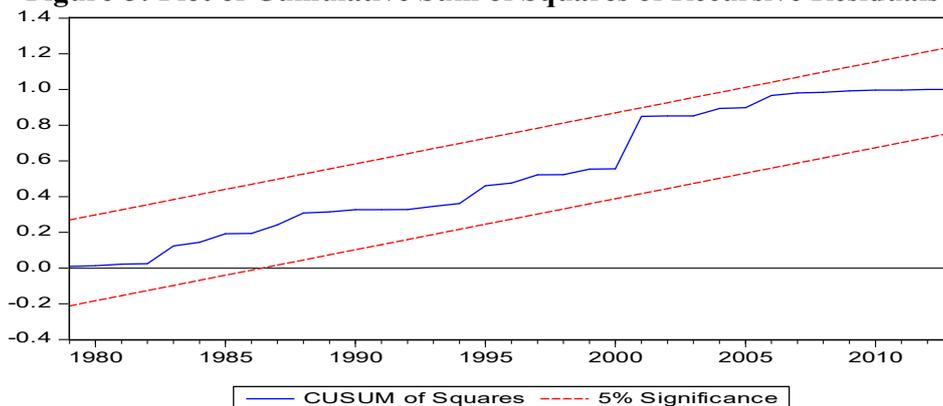
The straight lines represent critical bounds at 5% significance level

The direction of causal relationship between the variables is investigated by applying the VECM Granger causality test. This test is suitable once variables have cointegration and integrated at I(1). It not only determines the direction of causality for short-run but also for long-run. The results of VECM Granger causality are reported in Table-8. In the long-run, the relationship between economic growth and gender inequality is bidirectional: economic growth causes gender income inequality and gender inequality causes economic growth in the Granger sense. The feedback effect is found between financial development and gender inequality. Foreign direct investment Granger causes gender inequality and in result, gender inequality Granger causes foreign direct investment. Trade openness Granger causes gender inequality, economic growth, financial development, and foreign direct investment.

Table-8: The VECM Granger Causality Analysis

Dependent Variable	Direction of Causality					
	Short-run					Long Run
	$\Delta \ln G_{t-1}$	$\Delta \ln Y_{t-1}$	$\Delta \ln F_{t-1}$	$\Delta \ln O_{t-1}$	$\Delta \ln I_{t-1}$	ECT_{t-1}
$\Delta \ln G_t$	....	0.4889 [0.6184]	1.6041 [0.2190]	1.3718 [0.2702]	0.6238 [0.5431]	-0.0312* [-3.4521]
$\Delta \ln Y_t$	0.6982 [0.5062]	....	0.7606 [0.4837]	0.4887 [0.6187]	1.0217 [0.3735]	-0.1318*** [-1.9699]
$\Delta \ln F_t$	1.0947 [0.3490]	0.8836 [0.4249]	....	1.3311 [0.2810]	4.6025** [0.0191]	-0.3696** [-2.4293]
$\Delta \ln O_t$	0.0162 [0.9892]	0.3203 [0.7285]	0.9825 [0.3869]	....	0.1743 [0.8409]	....
$\Delta \ln I_t$	0.6895 [0.5101]	0.5369 [0.5904]	1.1885 [0.3205]	0.4680 [0.6311]	....	-0.1605*** [-1.7041]
Note: *, ** and *** show significance at 1, 5 and 10 per cent levels respectively.						

In the short-run, foreign direct investment Granger causes financial development. The neutral effect is found between economic growth and gender inequality. Financial development does not cause gender inequality and gender inequality does not cause financial development. A neutral effect is found between foreign direct investment and gender inequality.

VI. Conclusion and Policy Implications

This paper investigates the macro-economic determinants of gender inequality in highly gendered society i.e. Pakistan. In the trrust, we empirically examined the impact of financial development and trade openness on gender inequality by incorporating economic growth and foreign direct investment in gender inequality function using updated data over the period is 1972-2013, in case of Pakistan. After using ZA unit root test that accommodates single structural breaks in the series, the results of Bayer-Hanck combined cointegration and bounds approaches to cointegration confirmed the long-run relationship among the variables. It implies that gender inequality does influnced by the selected macro-economic variables in the long-run. Subsequently, the short-run and long-run elasticities are determined to inspect the magnitude and direction of each macro-economic variable brings to gender inequality in Pakistan. The results found that 1% rise in financial development increases gender disparity in long-run and short-run by 0.13 and 0.065, respectively. However, economic growth reduces gender related inequality in

the long-run but, it has positive and statistically significant impact in short-run i.e. 0.06 and 0.01, respectively. Trade openness and FDI reduce gender inequality in long-run and short-run. The VECM Granger causality test results show the bidirectional causality between gender inequality and economic growth. It means the economic growth feeds gender based inequality and in return it feeds back economic growth. In its current state, increasing economic growth widens gap between male and female opportunities. Similarly, financial development also causes gender inequality and in resulting, gender inequality causes financial development in Granger sense i.e. feedback effect. The relationship between foreign direct investment and gender inequality is bidirectional. The unidirectional causal relationship is found running from trade openness to gender inequality, economic growth, financial development and foreign direct investment. The structural breaks point out the transformational changes that an economy observes due to economic policy shift, change in regime, political setback, or any extraordinary economic event.

The notion that financial development reduces gender inequality further advise, the provision of better financial services renders enhanced employment and other income generation opportunities for both male and female. The financial reforms started in 1980s have significantly contributed in economy's growth. Similarly, this financial sector development also reflects in our results. As mentioned earlier, banking sector dominates Pakistan's financial system, during the reforms era, a separate and specialised public sector bank[16] was established only to serve the financial matters of women in the country. The bank also provides micro, small and mediumterm loans to enhance entrepreneurial activities among women[17]. Although, FWBL hasplaying a significant role in reducing child labor but comprehensive efforts are needed to encourage women for their significant contribution in economic activity. However, in order to achieve the third MDG of United Nations, Pakistan is still far behind the target to be achieved by 2015. There is need of drastic steps to strengthen the financial standing of Pakistani women, where rest of commercial banks and other development financial institutions should take part by prioritizing the areas of gender gap. These banks may be asked to design special policies to enhance income-generating activities for women, provide cheaper loans to female for their education, health, and business establishment. Financial institutions also make loans to women when hospitalized during childbirth. Furthermore, Pakistan is an agrarian economy and more than 90 of rural economy is linked with agriculture sector. Offering women farmers easy access to credit for the purchase of technological inputs will empower them in the agriculture sector. It not only raises agricultural productivity but also increases food production which will import demand for food items. This will improve gender distribution by raising income of women and reduce the deficit in balance of payment (Seguino, 2009). There is also a need for a comfortable working environment for women.

The results also indicate that trade openness reduces the gender gap in Pakistan. These results are consistent with the fact that Pakistan has always been an advocate of trade liberalization. Pakistan is the most trade-friendly country in South Asia. Trade liberalization enhances the country's ability to receive comparative advantage that leads to efficient resource utilization and contributes to national income. The higher degree of trade trade openness creates higher external

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[16] First Women Bank Limited (FWBL) a specialized public sector bank established in 1989 to provide financial services to Pakistan's women.

[17] In 2001, FWBL allocated loans to 2921 women to bring them out of poverty with 100% recovery rate.

demand for domestic goods and services and this resource mobilization disseminates its effects among all stake holders. Similarly, the gender gap is reduced and women receive better economic opportunities. Unfortunately, the energy crisis and the breakdown of law and order in the country has widened the trade deficit. Many industrial units have been shut down, the remaining plants are not always operational due to energy shortage and have diminished investor confidence. This leads to a wider gender income gap. This is predicted by the unidirectional causality from trade openness to gender inequality in our results. Government needs to address the energy and security concerns of investors along with the trade friendly policies, otherwise just adoption of trade liberalization will negatively impact on Pakistan's economy further leading to trade deficit. This may exacerbate gender income inequality and poverty.

Foreign direct investment (FDI) has had a negative impact on gender inequality but its effect is subject to financial development and trade policies. The sound financial system ensures efficient use of incoming investment and trade friendly policies encourage foreign direct investment. The combination of effective trade policies, financial development and FDI can reduce gender income inequality in Pakistan. However, growth has positive relationship with gender inequality in short run but a negative relationship in the long run. It seems that there is an inverted U-shaped relationship. The other possibility of such relationship can also be some other variables that have some influence on gender inequality. These variables may be cultural, religious, and socio-economic in Pakistan's society.

The results of this study are more reliable for policy use in two ways. First, it uses dynamic econometric approach with variety of statistical tests that turn the model more robust than previous studies that are focused on simple regression techniques; and secondly, it also suggests better results than theresults of earlier studies by Klasen (2002), Klasen and Lamann (2009), and Branisa et al. (2013), because these studies mostly use panel and cross-country data that may not be candid for single country analysis. The adjustment of structural breaks in the time series enable model to estimate with more precision and reduced possibility of error term. For future research, this paper can be augmented by investigating the impact of trade openness on gender inequality by incorporating scale effect, technique effect and composite effect in gender inequality function using data of BRCIS region. The impact of trade comparative advantage effect on gender distribution can also be examined. In such a comprehensive study, we are able to find reliable and consistent empirical evidence that would be helpful for policy designing authorities using trade openness as tool to affect gender inequality. The impact of micro-finance schemes adopted by financial institutions on gender inequality is also an interesting topic for future research.

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Appendix

Variable	Definition of the Variable	Source of Data
G	Gender inequality is composite index of educational attainment index, surviaval index, labor participation index	Ahmed and Hyder, (2006) https://ideas.repec.org/p/pra/mprapa/16252.html
Y	Economic growth is measured by real GDP per Capita (constant pricess in local currency	Governmnet of Pakistan (GoP, 2014)
F	Financial development is measured by domestic credit to private sector as share of GDP	Governmnet of Pakistan (GoP, 2014)
O	Trade openness proxies by trade (exports + imports) as share of GDP	World Development Indicators (CD-ROM, 2014)
I	Foreign direct investment net inflows as share of GDP	World Development Indicators (CD-ROM, 2014)