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Inclusivity of Factor Flows in a Labor-Surplus Economy: Experience of the Philippines

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Abstract

Under the assumption of full employment, we probed the impact of labor emigration on wages, employment, and production in the capital- and labor-intensive sectors of the Philippines, represented by manufacturing and agriculture, respectively. We investigated whether deployment, remittances, and foreign direct investment (FDI) flows are inclusive given the consequential employment opportunities for unemployed resources left behind, specifically unskilled workers that are biased towards the employment of labor and the production of labor-intensive goods. Subjecting Philippine data, from 1991 to 2021 to Vector Autoregression (VAR), we generated Orthogonal Impulse-Response Function (IRF) and Forecast Error Variance Decomposition (FEVD) to capture the response of wages, employment, and production in the capital- and labor-intensive sectors on impulses emanating from deployment, remittances, and FDI flows. Empirical results revealed the following key findings: (1) deployment, remittances, and FDI flows are not inclusive because it worsens the situation in the agricultural sector; (2) although deployment and FDI flows increase employment in the manufacturing sector, production does not increase due to limited capital inputs; (3) The capital-intensive sector benefits more from FDI flows than the labor-intensive sector. Despite such results, there are potentials of inclusivity in both sectors provided critical constraints in the labor-sending economy are addressed. Our study contributes to explicating how development strategies that rely on labor emigration and FDI can be recalibrated and made sufficient to achieve inclusive growth. We also augmented literature on the impacts of labor emigration on the sending-economy, particularly the Philippines.

Keywords: agriculture, employment, FDI, labor emigration, manufacturing, production, remittances, wages

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Inclusivity of Factor Flows in a Labor-Surplus Economy: Experience of the Philippines

John Paolo R. Rivera and Tereso S. Tullao, Jr.***

1. Introduction

The impacts of immigration on the labor markets of receiving developed economies have been established in the literature (Vargas-Silva & Sumption, 2023; Dumont & Liebig, 2014; Dustmann et al., 2008; Venturini & Villoso, 2004). However, not much has been done on the effects of labor emigration on the labor market of sending developing economies (Murakami et al., 2021; Paul, 2018). For studies probed on such, its impacts are manifested through the wage rate of those left behind (Docquier et al., 2010). Because labor emigration reduces the labor force of the sending-economy, its short-term impact is to increase the wage rate in the sending-economy (Vargas-Silva, 2020; Brown, 2015). This was found to be reasonably true for non-emigrants with substitutable skills with that of emigrants but non-emigrants with different and complementary skills lose (Elsner, 2022, 2015).

Because labor emigration reduces the labor force of the sending-economy, it will result in the sending-economy's production possibilities frontier (PPF) to contract (i.e., shift inwards) (Salvatore, 2019). Holding commodity prices constant, the production of capital- and labor-intensive goods will also contract (Jinkjarak & Naknoi, 2011). Hence, reduced labor force with fixed capital inputs will reduce production despite higher labor productivity (Romer, 1990).

Such contraction in the PPF and decline in the production of capital- and labor-intensive goods in the sending-economy can be mitigated if unemployment is high in the sending-economy (Trehan, 2001). In this case, the sending-economy's PPF will not shift inwards, there is no reduction in the production of labor- and capital-intensive goods, and there is no change in labor productivity. However, the issue of underemployment cannot be ignored (Organisation for Economic Co-operation and Development [OECD], 2017). In the Philippines, Paqueo et al. (2014) argued that it remains to have a large and increasing labor surplus. Historically, the Philippine Overseas Employment Administration (POEA) reported that at least 10 per cent of the economy's population (14% of labor force) are permanent residents, temporary workers, or irregular migrants abroad with at least two million being deployed to various economies, with Middle East, Southeast Asia, United States of America (USA), United Kingdom (UK), Italy, and Canada receiving the highest numbers of Overseas Filipino Workers (OFW[1]).

This phenomenon generated cash remittances that augmented the Philippines' foreign currency reserves, enhanced household consumption levels, and stabilized the economy during crises. Consequently, the economy has relied on OFWs' remittances (Rivera, 2013). According to Ochave (2020), the Philippines is one of the largest destinations for remittances from migrant workers. Data from the Bangko Sentral ng Pilipinas (BSP) reported that remittance inflows in

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[1] Per Republic Act 8042 (Migrant Workers and Overseas Filipinos Act of 1995), migrant worker refers to a person who is to be engaged, is engaged or has been engaged in a remunerated activity in a state of which he or she is not a legal resident.

2022 was at USD 32.54 billion (approximately 10% of Gross Domestic Product [GDP]); and as of September 2023, total remittance inflows already amount to USD 24.49 billion[2].

As such, there is pressure for wages to remain low so that firms (i.e., micro, small, and medium enterprises [MSMEs]) will be able to absorb the surplus of labor. Until sufficient labor surplus is absorbed, which is signaled by sustained increases in wages of unskilled labor, rising wages is an unlikely engine of poverty reduction for labor without substantial human capital.

In the long-run, labor emigration integrates the impact of an increase in wage rate on the capital-labor ratio (Henderson, 2020) and on commodity prices (Suthaharan & Bleakley, 2022; Fløystad, 1972). Holding interest rates constant, an increase in wage rate will increase factor price ratio (price of labor/price of capital) that will increase commodity price ratio (price of labor-intensive good/price of capital-intensive good) (Cacnio, 2017; Lemos, 2004; Behman, 1969). Rising commodity prices favoring labor-intensive goods will increase the production of labor-intensive goods and reduce production of capital-intensive goods (Jones, 2003).

1.1. Rationale

Integrating both short- and long-run effects, labor emigration may temper the reduction in the production of labor-intensive goods. It may also reinforce the decrease in production of capital-intensive goods. These outcomes are possible under the assumption of full employment.

However, if the sending-economy has unemployed resources, labor emigration will have no effect on factor and commodity prices. Hence, we hypothesize that **labor emigration becomes inclusive since it provides employment opportunities for unemployed laborers left behind in the sending-economy (Hypothesis 1)**. By inclusivity in the labor market, it means *everyone in the labor force population, particularly the vulnerable, marginalized, and disadvantaged people, can participate in quality and paid work* (European Commission, n.d.).

Meanwhile, suppose the inflow of FDIs is directed in the capital-intensive sector. In the short-term, it will increase labor demand given increased capital. This will trigger wage rate to increase that will shift labor from labor-intensive to capital-intensive sector. The shift will expand production in the capital-intensive sector and reduce production in the labor-intensive sector. This is non-inclusive. However, in the long-term, if factor prices are incorporated in commodity prices, the increase in wage rate will reduce the relative price of capital. This will increase the price of labor-intensive goods relative to capital-intensive goods. Given an expanded PPF due to changes in the total amount of available factor inputs, advancements in technology, influx of FDIs, the production of labor-intensive goods may increase and temper the increase in the production of capital-intensive goods (Tomlinson, n.d.). As such, we hypothesize that **FDI flows may be inclusive in the long-run since it can give opportunities for unemployed laborers left behind in the sending-economy (Hypothesis 2)**.

1.2. Statement of the Problem

By inclusivity, opportunities are provided to the unemployed. However, it is biased towards employment of labor rather than capital, and production of labor-intensive goods than capital-intensive goods. Given the impacts of labor emigration and FDI flows on wages, we pose this

[2] For updates on remittance figures in the Philippines, see https://www.bsp.gov.ph/SitePages/Statistics/External.aspx?TabId=8

research question: *Does labor emigration and FDIs have an impact on the production and employment of labor-intensive sectors versus capital-intensive sectors in the Philippines?*

Addressing this problem statement will generate two outcomes: (1) hypothesis 1 and hypothesis 2 would be validate; and (2) provide answers to this follow up question: *How can development strategies that rely on labor emigration and FDI be recalibrated and made sufficient to achieve inclusive growth?*

1.3. General and Specific Objectives

In addressing the problem statement, our general objective is *to determine if migration and FDIs impact on the wages, employment, and production in the labor-intensive and capital-intensive sectors in the Philippines.* The following specific objectives are also set:

1. To show the trends in migration flows, FDI flows, wages, employment, and production in the labor- and capital-intensive sectors of the Philippines;
2. To estimate the impacts of labor emigration and FDIs in the production and employment in the labor- and capital-intensive sectors in the Philippines;
3. To explicate conditions and provide policy implications on how labor emigration and FDIs can effectively lead to inclusive growth.

1.4. Scope and Limitations

Our constructs are measured as follows. We measure labor emigration using deployment and remittances; employment using wages and employment level; and FDIs using flows.

Our study relies on data from the Philippine Statistics Authority (PSA), BSP, and the World Bank (WB). While there are other plausible variables to represent our constructs, we are limited to variables whose data is complete, consistent, and accessible whether open access or under subscription. For instance, production is more appropriately measured by the Value of Production Index (VaPI, 2018=100) or the Volume of Production Index (VoPI, 2018=100) but it is not available for a longer period to warrant time series analysis. Likewise, VaPI and VoPI have been reported using different base years. Thus, an alternative metric that satisfies length, completeness, and consistency is used, specifically value added, which is available at WB.

Because data representing our variables are all time series, a longer period is required to perform time series analysis. However, data is gathered from multiple sources. Thus, we are limited by the consistency of data across sources. For instance, even if PSA has monthly or quarterly data for some variables of interest but BSP and WB only has annual data, the annual data as unit of analysis would prevail. Even if BSP and WB has available time series from 1950 but PSA has 1990 as earliest, the shorter time frame would prevail. Even if WB has 2022 as latest data point and PSA only have until 2021, the less recent year would prevail.

These also limit: (1) the number of variables that can be included in the empirical analysis to conserve degrees of freedom; and (2) the unit of analysis of empirical results (i.e., instead of a more granular unit of time like monthly or quarterly, annual would prevail). Due to limitations in the availability of disaggregated, consistent, and granular data, we assume that the manufacturing sector represents the capital-intensive sector, and the agricultural sector represents the labor-intensive sector.

Furthermore, such constraints limit the sources of inclusivity that can be incorporated in the empirical model. Available data anchors this study on trade liberalization variables. This quantitatively exclude other sources of inclusivity such as wellbeing level, gender inequality, access to digitalization, among others. While these factors are deemed important in explaining inclusivity, measuring them to be included in the empirical model would be challenging. A qualitative research design would best address these facets, which are beyond the scope of our study. Hence, inclusivity, in the context of this study, is anchored on trade liberalization.

1.5. Significance of the Study

While the impacts of labor emigration and FDIs on sending-economies have been discussed in scholarly research, few studies focused on their short- and long-run impacts on employment and production in the labor- and capital-intensive sectors of a developing economy like the Philippines. Hence, our results will augment the discourse by providing perspectives on the economic consequences of labor emigration than of the usual immigration.

Despite the pursuit of steady economic growth, the Philippines has been impaired by the persistence of unemployment and underemployment that compel labor emigration for better compensation (OECD, 2017). This discourse is important for the Philippines given its stature as a major labor-exporting economy (Duan & Lu, 2018; Center for Migrant Advocacy [CMA], 2009) and its dependence on remittances to keep its economy afloat (O'Neil, 2004). Our results can assist policymakers to recalibrate policy regimes not just to promote and regulate remittances but also harness its impacts on inclusivity and FDI inflows.

Addressing our research problem and objectives would facilitate examination and augmentation of empirical evidence on the impact of labor emigration and FDIs on economic growth, both in the short- and long-run, in developing economies like the Philippines (Dinh et al., 2019). Because the Philippines leverage FDIs to generate job opportunities, promoting labor equality and inclusivity, and stimulating economic growth and development (The Manila Times, 2022), it is imperative for policymakers and economic players to find ways to maximize these benefits and sustain the positive impetus. Hence, results will generate policy implications that can recalibrate development strategies using FDIs as a vehicle to promote inclusivity.

According to Mantovani and de Crombrugghe (2022), Southeast Asia is generally characterized as a hotspot for FDIs, with inflows having increased by nine in the past two decades, with more than 50 per cent going to Singapore. In this distribution, it was reported that the Philippines is ranked in the middle of all economies in terms of total FDI inflows. However, the Philippines is harnessing the spillover effects of FDIs than most of its neighboring economies particularly on: (1) job creation from FDIs; (2) environmental sustainability from FDI; and (3) labor equality and knowledge transfer due to the employment practices of foreign enterprises. These reports motivate our study to probe also on the role of FDIs on inclusivity. Attracting more FDIs is just a necessary condition for economic growth. Sufficiency condition requires significant value-added be realized from FDIs. Thus, developmental policies must be reviewed not only to attract more FDIs but to assist sectors that can catalyze inclusivity in the Philippines.

Using the Philippine manufacturing and agricultural sectors as representatives of the economy's capital- and labor-intensive sectors, respectively, results provide empirical evidence on the degree by which labor emigration contributes to inclusivity.

2. Review of Related Literature

In addressing our first research objective, scholarly literature on the impact of labor emigration and FDIs on inclusive growth were reviewed. We begin with establishing the impacts of labor emigration and FDIs on inclusivity in the sending-economy. This is on the light of labor emigration's impact on factor prices in the sending-economy. Hence, its impact on wages, employment, and production can be traced.

2.1. Impact of Labor Migration on the Receiving-Economy

Labor migration's impact on the receiving-economy has been explicated (Engler et al., 2020; Tipayalai, 2020; Sherman et al., 2019; World Bank, 2018; Jaumotte et al., 2017; Merler, 2017; Ahsan et al., 2014; Dumont & Liebig, 2014; Wickramasekara, 2008; Dustmann et al., 2006; Bauer et al., 2005; Friedberg & Hunt, 1995; Hirose, 1994). Hence, we found value in probing on the impact of labor emigration on the sending-economy. While labor migration has both positive and negative impacts on both sending- and receiving economy, such phenomenon has to be managed. Katseli et al. (2006) comprehensively discussed the effects of migration on sending-economies. Managing labor migration may stimulate vital gains not only for migrants but also for sending- and receiving-economies. Sending economies, most of which are developing economies, may harness gains in terms of growth, investment, human capital accumulation, and poverty reduction if development policies would be recalibrated to diffuse the benefits to the entire economy. This points us to look into the impact of labor emigration and FDI on wages, employment, and production in the sending-economy.

2.2. Impact of Labor Emigration on Wages and Production in the Sending-Economy

Labor mobility across economies, particularly from less developed and developing economies to developed economies, poses substantial impact on the sending-economy. While the sending-economy will incur loss of human capital (i.e., brain drain) (Grebeniyk et al., 2021; Rivera & Tullao Jr., 2022, 2020) that will increase wages (Koczan et al., 2021; Vargas-Silva, 2020; Brown, 2015; Docquier et al., 2010), it also generates remittance flows (Bailey, 2015) and increases international connections through trade, FDIs, and technological transfers (Koczan et al., 2021). Hence, labor emigration generated economic and financial benefits to those left behind in the sending-economy. It provided temporary relief on domestic labor markets and helps reduce unemployment, particularly in economically-deprived areas (Kupets, 2012). However, according to Démurger (2015), it created distortions on the labor supply response of those who do not emigrate through higher reservation wages and reduced willingness to supply labor (Amuedo-Dorantes & Pozo, 2023).

Labor emigration generates remittance flows. Chami et al. (2018) presented cross-economy evidence on the effect of remittances on labor market outcomes. Remittances strongly impact both demand for and supply of labor in recipient-economies. It reduces labor force participation and overall unemployment for lower-wage, lower-productivity non-tradable industries at the expense of high-productivity, high-wage tradable industries. Hence, despite inequality declines due to larger remittances, average wage and productivity growth decrease.

These distortions prompted policymakers to: (a) reassess the effects of labor emigration and design new approaches to identify conditions by which labor emigration can foster inclusivity (Miracle & Berry, 1970); (b) recalibrate policies of both labor-sending and labor-receiving economies on implementing effective and fair management of labor migration to create mutual benefits (Grebeniyk et al., 2021); (c) design reforms to foster inclusivity given labor migration and remittances (Chami et al., 2018); and (d) design policies that will enhance business and employment opportunities, harness the benefits of financial and technological inflows, and mitigate the loss of highly skilled labor (Koczan et al., 2021).

We underscore the consequence of labor emigration on wages. Because labor emigration reduces the labor force of the sending-economy, its short-term impact increases the wage rate in the sending-economy (Koczan et al., 2021; Vargas-Silva, 2020; Elsner, 2022, 2015; Brown, 2015; Docquier et al., 2010). Emigration alleviate unemployment and increase the income of the remaining workers (Asch, 1994). While this is the general finding, there are cases wherein such relationship does not hold. Specifically, Docquier et al. (2010) found evidence that labor emigration in Europe had a negative effect on the wage of the less educated workers who were left behind in the sending-economy resulting to increased inequality (Docquier et al., 2010). Meanwhile, using data for various labor-sending and labor-receiving economies, Elsner (2022, 2015) found otherwise for non-emigrants with different and complementary skills.

Ceteris paribus, labor emigration generally decreases the sending-economy's labor force (Tuladhar et al., 2014; Asch, 1994). This prompts the sending economy's PPF to shift inwards as it experiences a reduction, loss, or exhaustion of its scarce human resources (Salvatore, 2019; Appleyard et al., 2010). This also reduces its productive capacities (Tuladhar et al., 2014). As such, the production of labor- and capital-intensive goods will decline (Jinkjarak & Naknoi, 2011). Hence, given fixed capital and a smaller PPF, the higher productivity of labor brought about by labor emigration will still result to lower output (Romer, 1990).

On the contrary, Trehan (2001) discussed that the inward shift of the sending-economy's PPF, and the reduced production of both labor- and capital-intensive goods, can be mitigated if there are many unemployed labor. Thus, the sending-economy's PPF will not shift inwards and there will be no change in labor productivity, and there will be no decline in the production of labor- and capital-intensive goods. However, Bräuninger and Pannenberg (2002) argued that for OECD economies, the impact of unemployment on productivity heavily depends on the influence of human capital – unemployment has a long-run effect on the level of productivity.

Rising wage rate due to labor emigration will impact commodity prices (Suthaharan & Bleakley, 2022; Fløystad, 1972) and capital-labor ratio (Henderson, 2020). Holding the price of capital constant, an increase in wage rate will increase factor price ratio (i.e., price of labor/price of capital), which will increase commodity price ratio (price of labor-intensive good/price of capital-intensive good) (Cacnio, 2017; Lemos, 2004; Behman, 1969). Hence, the increase in commodity prices favoring labor-intensive goods will increase the production of labor-intensive goods and reduce production of capital-intensive goods (Jones, 2003).

With remittances, Al Mamun et al. (2016, 2015) argued that remittance inflows sent by the migrant workers increase the investment and the capital stock of the remittance-recipient economy that enhance the capital-labor ratio and improve overall labor productivity. However, similar to Chami et al. (2018), Wonyra and Ametoglo (2020) found that remittances have a strong negative impact on agricultural labor productivity. For Amuedo-Dorantes and Pozo (2023), while remittances can enhance the welfare of households left behind and boost growth rates of remittance-recipient economies, it also increases reservation wages, and creates a culture of dependency that reduces labor force participation in remittance-recipient economies that inhibits productivity and economic growth.

2.3. Impact of FDI on Wages and Production in the Sending-Economy

FDIs are deemed effective instruments of promoting economic growth and development (OECD, 2002). It "brings capital and technology to target firms, industries, and locations, affecting demand for labor and therefore labor force composition, employment, average productivity, wage levels, and wage inequality" (Hale & Xu, 2016, p. 1). Notwithstanding spillover effects, FDIs result to: (1) higher wages and productivity because of an increase in skill premium (i.e., wage gap between skilled and lower-skilled workers); and (2) increased wages and productivity in local firms (Hale & Xu, 2016).

According to Arnal and Hijzen (2008), because evidence suggests that multinational enterprises (MNEs) tend to give higher compensation than their domestic counterparts, particularly when they operate in developing economies, FDIs' positive impact on wages, although small, diffuse to the laborers of domestic firms that serve as suppliers of MNEs, or recruit managers with prior experience working in foreign enterprises. Productivity also tends to increase because MNEs provide more training than domestic firms. This is supported by Abouelfarag and Abed (2018) wherein FDIs positively affects the average wages in the manufacturing sector in the long run. Thus, attracting more FDIs in the manufacturing sector will have a positive effect on average wages and raise the economy's production.

However, Vijaya and Kaltani (2007) found that FDI flows have a negative impact on overall wages, particularly in the manufacturing sector, and this impact is more pronounced among female workers. This is due to the reduction in bargaining power of labor given new labor market arrangements in a global economy where capital is free to move across economies in search of more favorable conditions. Hence, it can be construed that due to the reduction in overall wages in the manufacturing sector, it will result to reduced production of capital-intensive goods. The price of capital-intensive goods would increase attracting the inflow of capital. Consequently, in the short-term, there will be an increased labor demand to work with more capital. This will trigger wages to increase in the capital-intensive sector causing unemployed labor to offer their labor services or employed labor to shift from the labor-intensive sector to the capital-intensive sector. Therefore, the production of capital-intensive goods will attract foreign capital to capital-intensive sectors such as heavy industry, chemicals, construction, manufacturing, among others (Wysokińska & Kotwica, 1998). This will prompt employment to react to capital flow shocks that will reinforce the expansion of production in capital-intensive sector (Baškot, 2019).

Given factor prices in commodity prices, long-run effects manifest through wage increase that reduces the relative price of capital. This will increase the price of labor-intensive goods relative to capital-intensive goods. With an expanded PPF, the production of labor-intensive goods may increase and temper the increase in the capital-intensive goods (Tomlinson, n.d.). Hence, FDIs can give opportunities for unemployed laborers left behind in the sending-economy (Estrin, 2017; Rizvi & Nishat, 2009). It creates employment through new production opportunities and capacities (Brincikova & Darmo, 2014). As supported by Saucedo et al. (2020), FDI inflows into the manufacturing sector of Mexico generated positive impacts in low- and high-skilled employment.

In Ukraine, while remittances resulted to higher taxes and customs revenues and reduced labor supply diminishes revenues from labor taxes and social security contributions, policymakers invited migrants, particularly the skilled, to invest in, return to, and create an attractive business environment in the economy so they can stimulate employability by employing domestic labor (Pieńkowski, 2020). This improved social aspects labor migration in Ukraine.

The Philippine experience showed a different outcome. According to the International Labour Organization [ILO] (2019), the expectation that FDIs would lead to the creation of more jobs that will employ surplus labor left behind in the economy did not materialize because: (1) educational institutions are geared towards producing mostly professionals rather than middle-skilled workers that industries require; and (2) trade patterns have largely shifted from primary goods exports to intermediate goods exports.

The different results between Ukraine and the Philippines supports the findings of Kang and Martinez-Vasquez (2022) that not all FDIs can lift the welfare of the poorest segments of the population and promote inclusivity. This is because there are conditions by which FDIs can effectively stimulate inclusive growth. They found that: (1) FDI has a positive effect on inclusive growth when there is a sufficiently large manufacturing sector and infrastructure base in the FDI-recipient economy; (2) FDI has a positive yet indirect effect on inclusive growth when the FDI-recipient economy has a large services sector. These highlight the importance of an economy's absorptive capacity. That is, FDIs require a certain environment to create more linkages, spillovers, and employment (Sugiharti et al., 2022; Amann & Virmani, 2014).

Table 1 summarizes the impact of labor emigration and FDI on the sending economy's wages, employment, and production.

Table 1: A-priori Impacts of Labor Emigration and FDIs on Wages, Employment, and Production in the Sending-Economy based on Scholarly Literature

Impulse	Response	Impact	Source
Labor emigration	Wages in the sending-economy	+	Koczan et al. (2021); Vargas-Silva (2020); Elsner (2022, 2015); Brown (2015); Docquier et al. (2010); Asch (1994)
		-	Docquier et al. (2010); Elsner (2022, 2015)
		0	Bräuninger and Pannenberg (2002)
	Employment in the sending-economy	+	Kupets (2012); Asch (1994)
	Production in the sending-economy	-	Amuedo-Dorantes and Pozo (2023); Tuladhar et al. (2014); Jinkjarak and Naknoi (2011); Jones (2003); Romer (1990)
FDI	Wages in the sending-economy	+	Saucedo et al. (2020); Arnal and Hijzen (2008)
		-	Vijaya and Kaltani (2007)

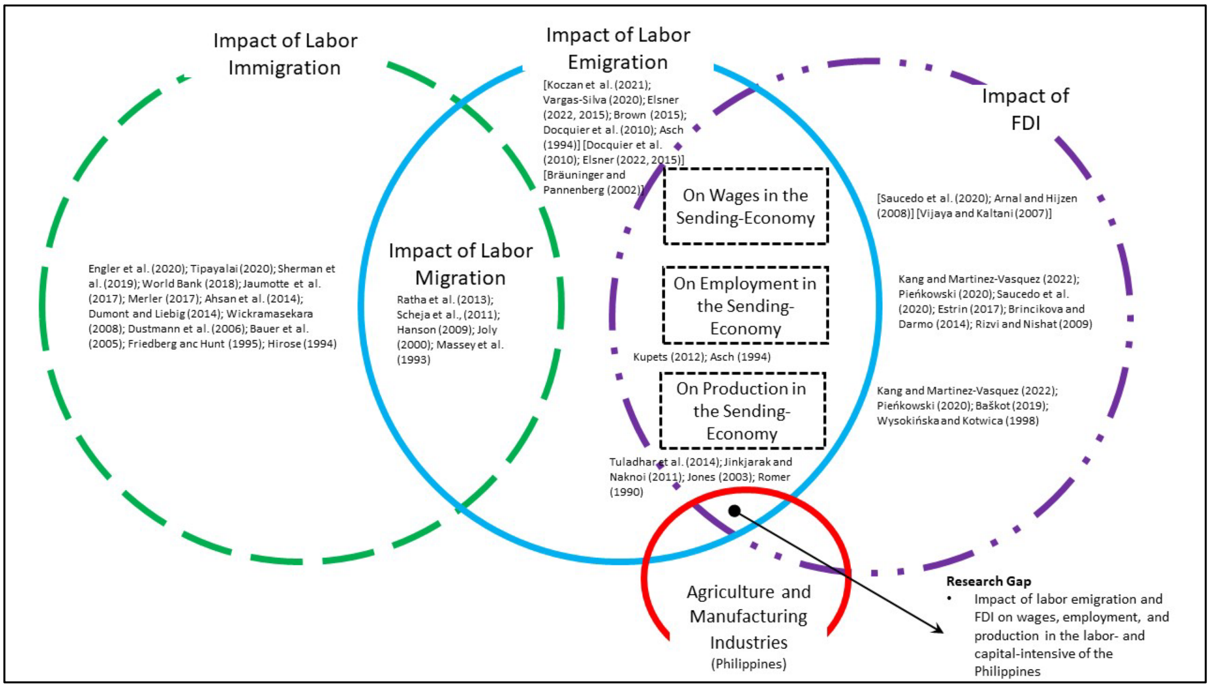
Employment in the sending-economy	+	Kang and Martinez-Vasquez (2022); Pieńkowski (2020); Saucedo et al. (2020); Estrin (2017); Brincikova and Darmo (2014); Rizvi and Nishat (2009)
Production in the sending-economy	+	Kang and Martinez-Vasquez (2022); Pieńkowski (2020); Baškot (2019); Wysokińska and Kotwica (1998)

Source: Compiled by the authors.

2.4. Research Gap

In identifying the research gap, Figure 1 maps the scholarly literature on the impacts of labor emigration on the sending-economy. It has been apparent that significant attention has been given in explicating the impacts of labor immigration than of emigration, when in fact, the immigrant of the receiving-economy is the same emigrant of the sending-economy. The discussion on the impacts of labor migration to the sending-economy remains to be limited. In the process of gathering relevant literature, search process using labor migration, immigration, and emigration as keywords generates mostly immigration and impacts of immigration on receiving-economies and wage of native workers in the receiving-economies. A few have touched both perspectives such as that of Massey et al. (1993); Joly (2000), Hanson (2009); Scheja et al., (2011); and Ratha et al. (2013). Echoing Démurger (2015), because of the limited discussion on the causal impact of emigration on those who are left behind, there remains a gap in tracing such dynamics with inconclusive evidence. Hence, we augment the literature on the impacts of labor emigration on the sending-economy particularly on wages, employment, and production in the capital- and labor-intensive sector of the Philippines.

Figure 1: Literature Map and Research Gap



Source: Constructed by the authors.

3. Research Design and Methodology

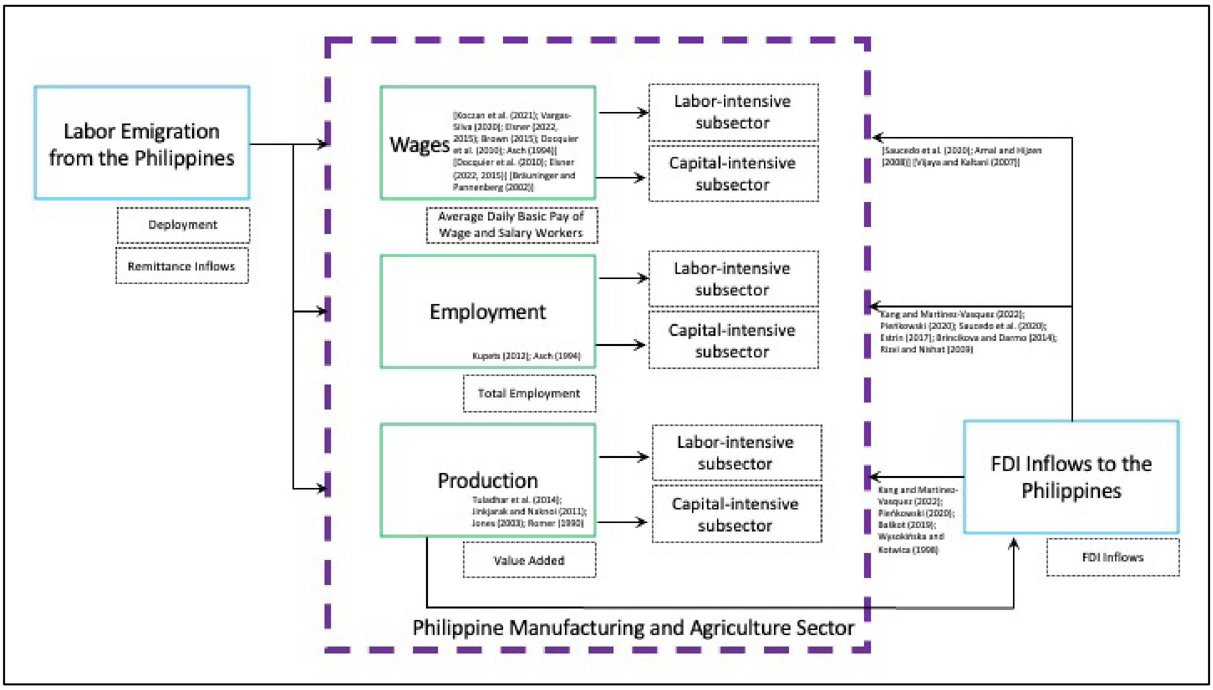
3.1. Conceptual Framework

On the basis of theory and scholarly literature Figure 2 maps the conceptual link between:

1. Labor emigration from the Philippines and FDI inflows to the Philippines as impulse variables;
2. Wages, employment, and production in the labor- and capital-intensive subsectors of the Philippines.

Feedback effects between FDI inflows and production in the labor- and capital-intensive subsectors of the Philippines are also mapped.

Figure 2: Conceptual Framework



Source: Constructed by the authors.

3.2. Research Design and Data Requirements

3.2.1. Vector Autoregression

In addressing our second research objective, we adapted the empirical approach of Rivera and Tullao Jr. (2022, 2020) subjecting macroeconomic data to Vector Autoregression (VAR). This was developed by Sims (1980) that generalizes the univariate autoregressive model to a dynamic multivariate time series. This is used in analyzing the dynamic behavior of time series variables towards forecasting, structural inference, and policy analysis (Enders, 2004).

Due to empirical issues in using FDI in classical inference (Poelhekke & van der Ploeg, 2013), we follow Baškot (2020) in estimating the causal link illustrated in Figure 2. VAR is "an answer on need for less structured equation systems" (p. 2638). It was deemed appropriate because it resembles a structural equation except that several endogenous variables are considered together. Each endogenous variable is explained by its lagged values and all other endogenous variables in the model (Gujarati & Porter, 2009). It is a-theoretic wherein the data generation process determines the model. However, it is susceptible to potential generalizations and simplification of a general group of models (Elliott et al., 2006). Nonetheless, this approach is chosen given the nature of data to be utilized and the existence of feedback effects between production and FDI inflows (Santos, 2023; Jimenez et al., 2021; Jung, 2020).

Equation 1 specifies a simple bivariate VAR(p) model, where p is the optimal lag order.

$$\begin{aligned} y_t &= \alpha_{10} + \alpha_{11} y_{t-1} + \alpha_{12} z_{t-1} + e_{yt} \\ z_t &= \alpha_{20} + \alpha_{21} y_{t-1} + \alpha_{22} z_{t-1} + e_{zt} \end{aligned} \tag{1}$$

where two shocks produce the error term $\begin{bmatrix} e_{1t} \\ e_{2t} \end{bmatrix} = \begin{bmatrix} 1 & b_{12} \\ b_{21} & 1 \end{bmatrix}^{-1} \begin{bmatrix} \varepsilon_{yt} \\ \varepsilon_{zt} \end{bmatrix}$.

3.2.2. Variable Declaration

From Equation 1, it can be seen that $p = 1$ (i.e., there is only one lag). Following Baškot (2020), from this simple bivariate VAR(p) model, it can be expanded to a multivariate case by including other variables and lags. Hence, we have the following system of equations represented in Equations 2 to 5:

$$\begin{cases} DEPLY_t \\ WMNFG_t \\ EMNFG_t \\ PMNFG_t \end{cases}; \begin{cases} DEPLY_t \\ WAGRI_t \\ EAGRI_t \\ PAGRI_t \end{cases} \tag{2}$$

$$\begin{cases} lnREMIT_t \\ WMNFG_t \\ EMNFG_t \\ PMNFG_t \end{cases}; \begin{cases} lnREMIT_t \\ WAGRI_t \\ EAGRI_t \\ PAGRI_t \end{cases} \tag{3}$$

$$\begin{cases} lnFDIFL_t \\ WMNFG_t \\ EMNFG_t \\ PMNFG_t \end{cases}; \begin{cases} lnFDIFL_t \\ WAGRI_t \\ EAGRI_t \\ PAGRI_t \end{cases} \tag{4}$$

$$\begin{cases} lnFDIFL_t \\ PMNFG_t \end{cases}; \begin{cases} lnFDIFL_t \\ PAGRI_t \end{cases} \tag{5}$$

Equation 2 observes deployment as measure of labor emigration as an impulse or shock to wages, employment, and production in the labor- and capital-intensive sectors of the Philippines, represented by the manufacturing and agricultural industry, respectively.

Equation 3 observes the logarithmic values of remittance inflows as measure of labor emigration as an impulse or shock to wages, employment, and production in the labor- and capital-intensive sectors of the Philippines, represented by the manufacturing and agricultural industry, respectively.

Equation 4 observes the logarithmic values of FDI inflows as an impulse or shock to wages, employment, and production in the labor- and capital-intensive subsectors of the Philippines, represented by the manufacturing and agricultural industry, respectively.

Equation 5 observes logarithmic values of FDI inflows as an impulse or shock to production in the labor- and capital-intensive sectors of the Philippines, represented by the manufacturing and agricultural industry, respectively. This estimates the feedback effect between production and FDI inflows as depicted in Figure 2.

Time series data sourced for national government (PSA, BSP) and multilateral agency (World Bank) will be subjected to our VAR(*p*) model specified in Equations 2 to 5.

Table 2 presents the trends of our variables for the period 1991 to 2021. The full dataset is in Appendix 1 to illustrate the trend of our variables. Table 3 presents the variable labels and corresponding descriptions.

Table 4 summarizes the a-priori expectations on the direction of relationships of the variables indicated in Table 3 and included in our VAR(*p*) model. Similar to Table 1, this is anchored on evidence found in literature.

Table 2: Trends of Variables

Variable	Trend
$DEPLY_t$	Deployment has been increasing through the years only to be significantly disrupted by the coronavirus (COVID-19) pandemic in 2020.
$REMIT_t$	Remittances have always been resilient and has been on an increasing trend with a slight dip during the COVID-19 pandemic in 2020.
$FDIFL_t$	FDI flows have been erratic depending on the Philippines' state of economic and political health.
$PMNFG_t$ and $PAGRI_t$	Production in the capital- and labor-intensive sector has been increasing with a dip during the COVID-19 pandemic in 2020.
$WMNFG_t$ and $WAGRI_t$	Wages in the capital- and labor-intensive sector has been increasing with apparent wage gap between the sectors.
$EMNFG_t$ and $EAGRI_t$	Employment in the capital- and labor-intensive sector has been increasing with a dip during the COVID-19 pandemic in 2020.

Source: Compiled by the authors.

Table 3: Variable Description and Source of Data

Variable Code	Variable Description	Measurement	Time Measure	Data Source
$DEPLY_t$	Deployment of OFWs abroad	Total number of OFWs deployed (in thousand persons)	Annual	PSA (Survey on Overseas Filipino)
$WMNFG_t$	Wages in the Philippine manufacturing industry (capital-intensive sector)	Average daily basic pay of wage and salary workers in the Philippine manufacturing industry (capital-intensive sector) (in PHP)	Annual	PSA (Labor Force Survey)
$WAGRI_t$	Wages in the agricultural industry (labor-intensive sector)	Average daily basic pay of wage and salary workers in the Philippine agricultural industry (labor-intensive sector) (in PHP)	Annual	PSA (Labor Force Survey)

$EMNFG_t$	Employment in the Philippine manufacturing industry (capital-intensive sector)	Employment in the Philippine manufacturing industry (capital-intensive) (number of people employed)	Annual	World Bank
$EAGRI_t$	Employment in the agricultural industry (labor-intensive sector)	Employment in the Philippine agricultural industry (labor-intensive) (number of people employed)	Annual	World Bank
$PMNFG_t$	Production in the Philippine manufacturing industry (capital-intensive sector)	Value added of the Philippine manufacturing industry (capital-intensive) (production level)	Annual	World Bank
$PAGRI_t$	Production in the agricultural industry (labor-intensive sector)	Value added of the Philippine agricultural sector (labor-intensive) (production level)	Annual	World Bank
$\ln REMIT_t$	Logarithmic values of remittance inflows to the Philippines	OFWs' cash remittances (in thousand USD) expressed in logarithmic values	Annual	BSP (Overseas Filipinos' Cash Remittances)
$\ln FDIFL_t$	Logarithmic values of FDI inflows to the Philippines	FDI inflows to the Philippines (in billion USD) expressed in logarithmic values	Annual	World Bank Macrotrends (Philippines Foreign Direct Investment)

Source: Compiled by the authors.

Table 4: A-priori Expectations of Variables of Interest

Impulse Variable	Response Variables	dy/dx	Basis
$DEPLY_t$	$WMNFG_t$	+	Elsner (2022, 2015); Koczan et al. (2021); Vargas-Silva (2020); Brown (2015); Docquier et al. (2010)
	$EMNFG_t$	+	Kupets (2012); Asch (1994)
	$PMNFG_t$	– (due to changes in factor prices)	Cacnio (2017); Lemos (2004); Jones (2003); Behman (1969)
		–	Salvatore (2019); Tuladhar et al. (2014); Jinkjarak and Naknoi (2011); Appleyard et al. (2010); Romer (1990)
		+/– (depending on who emigrated)	Bräuninger and Pannenberg (2002); Trehan (2001)
$DEPLY_t$	$WAGRI_t$	+	Elsner (2022, 2015); Koczan et al. (2021); Vargas-Silva (2020); Brown (2015); Docquier et al. (2010)
	$EAGRI_t$	+	Kupets (2012); Asch (1994)
	$PAGRI_t$	+ (due to changes in factor prices)	Cacnio (2017); Lemos (2004); Jones (2003); Behman (1969)
		–	Salvatore (2019); Tuladhar et al. (2014); Jinkjarak and Naknoi (2011); Appleyard et al. (2010); Romer (1990)
		+/–	Bräuninger and Pannenberg (2002); Trehan (2001)

		(depending on who emigrated)	
$\ln REMIT_t$	$WMNFG_t$	+	Elsner (2022, 2015); Koczan et al. (2021); Vargas-Silva (2020); Brown (2015); Docquier et al. (2010)
		-	Chami et al. (2018)
	$EMNFG_t$	+	Kupets (2012); Asch (1994)
	$PMNFG_t$	+	Koczan et al. (2021); Pieńkowski (2020); Bailey (2015); Al Mamun et al. (2016, 2015)
	$PMNFG_t$	-	Amuedo-Dorantes and Pozo (2023); Wonyra and Ametoglo (2020); Chami et al. (2018)
$\ln REMIT_t$	$WAGRI_t$	+	Elsner (2022, 2015); Koczan et al. (2021); Vargas-Silva (2020); Brown (2015); Docquier et al. (2010)
		-	Chami et al. (2018)
	$EAGRI_t$	+	Kupets (2012); Asch (1994)
	$PAGRI_t$	+	Koczan et al. (2021); Pieńkowski (2020); Bailey (2015); Al Mamun et al. (2016, 2015)
	$PAGRI_t$	-	Amuedo-Dorantes and Pozo (2023); Wonyra and Ametoglo (2020); Chami et al. (2018)
$PMNFG_t$	$\ln FDIFL_t$	+	Santos (2023); Jimenez et al. (2021); Jung (2020)
$PAGRI_t$	$\ln FDIFL_t$	+	Santos (2023); Jimenez et al. (2021); Jung (2020)
$\ln FDIFL_t$	$WMNFG_t$	+	Saucedo et al. (2020); Arnal and Hijzen (2008)
		–	Vijaya and Kaltani (2007)
	$EMNFG_t$	+	Kang and Martinez-Vasquez (2022); Pieńkowski (2020); Saucedo et al. (2020); Estrin (2017); Brincikova and Darmo (2014); Rizvi and Nishat (2009)
	$PMNFG_t$	+	Kang and Martinez-Vasquez (2022); Sugiharti et al. (2022); Pieńkowski (2020); Baškot (2019); Amann and Virmani (2014); Wysokińska and Kotwica (1998)
$\ln FDIFL_t$	$WAGRI_t$	+	Saucedo et al. (2020); Arnal and Hijzen (2008)
		–	Vijaya and Kaltani (2007)
	$EAGRI_t$	+	Kang and Martinez-Vasquez (2022); Pieńkowski (2020); Saucedo et al. (2020); Estrin (2017); Brincikova and Darmo (2014); Rizvi and Nishat (2009)
	$PAGRI_t$	+	Kang and Martinez-Vasquez (2022); Sugiharti et al. (2022); Pieńkowski (2020); Baškot (2019); Amann and Virmani (2014); Wysokińska and Kotwica (1998)

Source: Compiled by the authors.

3.2.3. Standard Time Series Procedures

Expressing Equations 2 to 5 in an error-correction modelling format of a VAR(p) model, standard time-series econometric techniques will facilitate analysis of short-run dynamics.

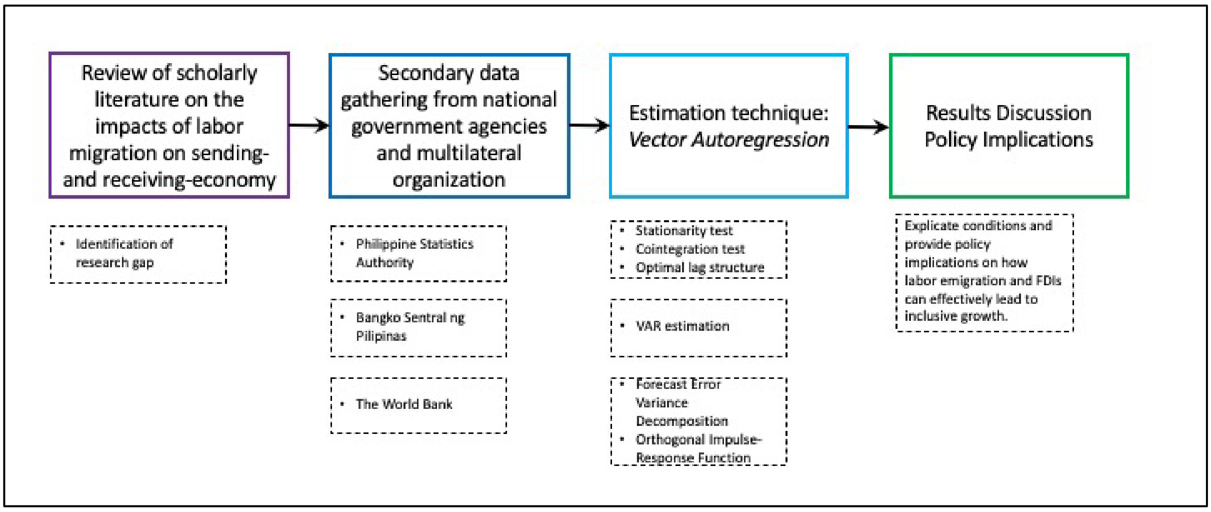
Prior to starting any time series analysis, we need to establish first stationarity, cointegration, and optimal lag order among our variables of interest. By implementing the Phillips-Perron Stationarity Test and the Engle-Granger Cointegration Test, we can established that: (1) we would be using level or first differenced values; and (2) there exists cointegration between our variables of interest. Note that if there exists a stationary linear combination of non-stationary random variables, such variables combined are cointegrated (Ender, 2004). That is, "cointegration is said to exist between two or more non-stationary time series if they possess the same order of integration and a linear combination (weighted average) of these series is stationary" (Paul, 2014, 281). Hence, we can establish empirical relationship between our chosen variables. We also determine the optimal lag order, denoted by p in our VAR(p) model, through the Final Prediction Error (FPE), Akaike Information Criterion (AIC), Hannan-Quin Information Criterion, and the Schwarz Bayesian Information Criterion (SBIC). The optimal lag order selection for each of the equation in the system is based on the order of integration determined from the stationarity test.

3.2.4. VAR Estimation and Post-VAR Analysis

With information on the order of differentiation, existence of cointegration, and optimal lag order, the VAR(p) model can now be estimated following the notation in Equation 1. Our VAR(p) estimates are expounded using post-VAR results through the Forecast Error Variance Decomposition (FEVD) and Orthogonal Impulse-Response Function (OIRF), which can be used for inferences. Enders (2004) explained that the FEVDs partition the variations in a variable to shocks in other variables in the system including its own innovations. It provides natural measures of relative importance of various shocks in explaining the variable of interest. Meanwhile, the OIRF traces the responses of the variables in the system to one standard deviation shocks in other variables. They indicate directions, magnitudes, and persistence of a variable's responses to impulses in the system.

It is important to note that in the generation of variance decompositions and impulse–response functions, innovations contained in the equations may be contemporaneously correlated. That is, a shock in one variable may work through the contemporaneous correlation with innovations in other variables. Since isolated shocks to individual variables cannot be identified due to contemporaneous correlation, the responses of a variable to innovations in another variable of interest cannot be amply represented (Enders 2004). To resolve this, an empirical strategy that orthogonalizes the innovations is employed – the Cholesky factorization.

Figure 3: Methodological Process



Source: Constructed by the authors.

4. Results and Discussion

4.1. Standard Time Series Analysis Procedures

Table 5 presents the results of the Phillips-Perron stationarity test. We establish that all our variables have varying order of integration. Except for $\ln FDIFL_t$, which is stationary at level values (i.e., integrated of order 0), and $WAGRI_t$, which is stationary at second differencing (i.e., integrated of order 2), the rest of the variables are stationary at first differencing (i.e., integrated of order 1). Because the highest order of integration must prevail (Enders, 2004), we will subject all variables to first differencing because: (1) it is much more difficult to interpret variables in its second differencing (i.e., growth of the growth rate), and (2) since our time series data is limited, degrees of freedom is conserved by preferring first differencing that second differencing. Using the first differenced values of $WAGRI_t$ is better than using its level values (i.e., the first differenced values are closer to stationarity than level values).

Results of the Phillips-Perron stationarity test are supplemented with the Engle-Granger cointegration test. This is to establish whether there exists long run relationship between the variables of interest indicated in Equations 2 to 5. Table 6 summarizes the cointegration results. All equations demonstrated cointegration.

Table 5: Order of Integration of Variables as per the Phillips-Perron Stationarity Test

Variable	Order of Integration, $I(d)$	Test Statistic, $Z(t)$	Critical Value	Alpha	MacKinnon p-value for Z(t)
$DEPLY_t$	1	-4.756	-3.723	1%	0.0001
$\ln REMIT_t$	1	-4.523	-3.723	1%	0.0002
$\ln FDIFL_t$	0	-3.452	-2.986	5%	0.0093
$PMNFG_t$	1	-7.038	-3.723	1%	0.0000
$WMNFG_t$	1	-4.910	-3.723	1%	0.0000
$EMNFG_t$	1	-8.041	-3.723	1%	0.0000
$PAGRI_t$	1	-4.100	-3.723	1%	0.0010
$WAGRI_t$	2	-11.435	-3.730	1%	0.0000
$EAGRI_t$	1	-5.377	-3.723	1%	0.0000

Source: Computed by the authors.

Table 6: Summary Results of the Engle-Granger Cointegration Test

Equation	Variables	Test Statistic, $Z(t)$	Critical Value	Alpha	Remarks
2	$D1.DEPLY_t$ $D1.WMNFG_t$ $D1.EMNFG_t$ $D1.PMNFG_t$	-5.186	-5.313	1%	Cointegrated
2	$D1.DEPLY_t$ $D1.WAGRI_t$ $D1.EAGRI_t$ $D1.PAGRI_t$	-6.138	-5.313	1%	Cointegrated

3	$D1.lnREMIT_t$ $D1.WMNFG_t$ $D1.EMNFG_t$ $D1.PMNFG_t$	-5.315	-4.497	5%	Cointegrated
3	$D1.lnREMIT_t$ $D1.WAGRI_t$ $D1.EAGRI_t$ $D1.PAGRI_t$	-5.124	-4.497	5%	Cointegrated
4	$D1.lnFDIFL_t$ $D1.WMNFG_t$ $D1.EMNFG_t$ $D1.PMNFG_t$	-7.755	-5.313	1%	Cointegrated
4	$D1.lnFDIFL_t$ $D1.WAGRI_t$ $D1.EAGRI_t$ $D1.PAGRI_t$	-7.685	-5.313	1%	Cointegrated
5	$D1.lnFDIFL_t$ $D1.PMNFG_t$	-8.272	-4.301	1%	Cointegrated
5	$D1.lnFDIFL_t$ $D1.PAGRI_t$	-8.302	-4.301	1%	Cointegrated

Source: Computed by the authors.

We also determine the optimal lag order, denoted by p in our VAR(p) model, using various information criterion. The optimal lag order selection for each of the equation in the system is based on the order of integration determined in Table 5. Table 7 summarizes the optimal lag order for each of our variables of interest. The maximum lag order prescribed by any of the information criterion is selected. Since most of our equations have been prescribed an optimal lag order of 4, we apply this to all our equations for consistency and co.

Table 7: Summary Selection of Optimal Lag Order (p).

Equation	Variables	FPE	AIC	HQIC	SBIC	Chosen p
2	$D1.DEPLY_t$ $D1.WMNFG_t$ $D1.EMNFG_t$ $D1.PMNFG_t$	2	4	0	0	4
2	$D1.DEPLY_t$ $D1.WAGRI_t$ $D1.EAGRI_t$ $D1.PAGRI_t$	4	4	4	0	4
3	$D1.lnREMIT_t$ $D1.WMNFG_t$ $D1.EMNFG_t$ $D1.PMNFG_t$	0	0	0	0	4 (by default)
3	$D1.lnREMIT_t$ $D1.WAGRI_t$ $D1.EAGRI_t$ $D1.PAGRI_t$	3	3	3	0	4 (by default)
4	$D1.lnFDIFL_t$ $D1.WMNFG_t$ $D1.EMNFG_t$ $D1.PMNFG_t$	0	0	0	0	4 (by default)

4	$D1.lnFDIFL_t$ $D1.WAGRI_t$ $D1.EAGRI_t$ $D1.PAGRI_t$	3	3	3	0	4 (by default)
5	$D1.lnFDIFL_t$ $D1.PMNFG_t$	1	1	0	0	4 (by default)
5	$D1.lnFDIFL_t$ $D1.PAGRI_t$	0	0	0	0	4 (by default)

Source: Computed by the authors.

Detailed results of the Phillips-Perron stationarity test, Engle-Granger cointegration test, and optimal lag order selection are presented in Appendix 2 in *Stata* log document.

4.2. Empirical Findings

In estimating our VAR(p) model indicated in Equations 2 to 5, time series specifications identified in Tables 5 to 7 have been incorporated.

4.2.1. VAR Results

Table 8 presents the VAR estimates of Equation 2 showing the impact of deployment on wages, employment, and production in the capital- and labor-intensive sectors of the Philippines.

Table 8: Summary VAR(p) Results for Equation 2

Capital-intensive sector				Labor-intensive sector			
Impulse	**Response**	**Coefficient**	***p***	**Impulse**	**Response**	**Coefficient**	***p***
L1.D1.*DEPLY*$_t$	D1.*WMNFG*$_t$	0.0057	0.5350	L1.D1.*DEPLY*$_t$	D1.*WAGRI*$_t$	0.0060	0.0190
L2.D1.*DEPLY*$_t$		-0.0032	0.6710	L2.D1.*DEPLY*$_t$		0.0163	0.0000
L3.D1.*DEPLY*$_t$		0.0224	0.0020	L3.D1.*DEPLY*$_t$		0.0180	0.0000
L4.D1.*DEPLY*$_t$		0.0302	0.0030	L4.D1.*DEPLY*$_t$		0.0344	0.0000
L1.D1.*DEPLY*$_t$	D1.*EMNFG*$_t$	-194.1467	0.5380	L1.D1.*DEPLY*$_t$	D1.*EAGRI*$_t$	-364.7007	0.4670
L2.D1.*DEPLY*$_t$		-242.7147	0.3470	L2.D1.*DEPLY*$_t$		-756.4681	0.1710
L3.D1.*DEPLY*$_t$		600.2947	0.0160	L3.D1.*DEPLY*$_t$		101.3016	0.8600
L4.D1.*DEPLY*$_t$		-89.1134	0.7970	L4.D1.*DEPLY*$_t$		-314.1808	0.6060
L1.D1.*DEPLY*$_t$	D1.*PMNFG*$_t$	-16,291.56	0.4490	L1.D1.*DEPLY*$_t$	D1.*PAGRI*$_t$	-1,643.69	0.6870
L2.D1.*DEPLY*$_t$		-12,635.57	0.4730	L2.D1.*DEPLY*$_t$		6,518.24	0.1460
L3.D1.*DEPLY*$_t$		-5,259.90	0.7560	L3.D1.*DEPLY*$_t$		8,267.24	0.0770
L4.D1.*DEPLY*$_t$		31,455.32	0.1830	L4.D1.*DEPLY*$_t$		-5,062.51	0.3060
L1.D1.*WMNFG*$_t$	D1.*EMNFG*$_t$	20,761.71	0.0020	L1.D1.*WAGRI*$_t$	D1.*EAGRI*$_t$	-46,112.75	0.0150

L2.D1.$WMNFG_t$		-20,341.40	0.0210	L2.D1.$WAGRI_t$		-11,342.33	0.6920
L3.D1.$WMNFG_t$		21,031.93	0.0070	L3.D1.$WAGRI_t$		11,713.02	0.7230
L4.D1.$WMNFG_t$		-29,571.94	0.0000	L4.D1.$WAGRI_t$		1,787.70	0.9620
L1.D1.$EMNFG_t$	D1.$PMNFG_t$	2.4661	0.8850	L1.D1.$EAGRI_t$	D1.$PAGRI_t$	-3.8543	0.0310
L2.D1.$EMNFG_t$		22.7393	0.2060	L2.D1.$EAGRI_t$		0.5697	0.7840
L3.D1.$EMNFG_t$		11.1895	0.6130	L3.D1.$EAGRI_t$		-5.1235	0.0020
L4.D1.$EMNFG_t$		-13.2016	0.4810	L4.D1.$EAGRI_t$		-0.6472	0.7500

Note: See Appendix 3.1 and Appendix 3.2 for the full VAR(p) estimated results; shaded areas indicate statistical significance at least at the 10% alpha.
Source: Computed by the authors.

Deployment increases wages in both capital- and labor-intensive sectors. This is consistent with theory and literature that predicts an inverse relationship between labor supply and wages. We note that deployment increases wages in both capital- and labor-intensive sectors, the wage increase more pronounced in the latter. Because deployment reduces labor supply given domestic demand for labor, it will trigger a wage increase in both sectors. This reinforces the findings of Elsner (2022, 2015), Koczan et al. (2021), Vargas-Silva (2020), Brown (2015), and Docquier et al. (2010). Labor emigration has economic and financial benefits to those left behind by increasing their labor income.

While labor emigration reduces the labor force, **deployment has a positive impact on employment in the capital-intensive sector**. Deployment increases employment in the manufacturing sector. Consistent with theory, a decline in labor supply due to deployment will increase employment in the capital-intensive sector because of emigrating labor from the labor-intensive sector. Such results are aligned with Kupets (2012) and Asch (1994).

However, **deployment has a negative and statistically insignificant effect on employment in the labor-intensive sector**, across all lags. This is because the positive effect of an increase in wage rate on employment is offset by the reduction of labor due to deployment. Alternatively, while the Lewis' model of structural change (Todaro & Smith, 2014) predicts the possibility that surplus labor from the labor-intensive sector moves to the capital-intensive sector due to the relative unevenness in wages and living standards, mobility may not be feasible as there exist mismatches in skills available in the labor-intensive sector vis-à-vis required skills in the capital-intensive sector. In addition, the unemployed worker in labor-intensive sector are not mobilized to work because of the limited or lack of skills. We can construe that the negative impact of deployment on employment can trigger a lower output in agriculture, which is consistent with theory.

Results also show that **deployment is not a strong predictor of production in the capital-intensive sector**. This opposes the findings of Salvatore (2019), Tuladhar et al. (2014), Jinkjarak and Naknoi (2011), Appleyard et al. (2010), and Romer (1990) indicating a negative impact of deployment on production. While we expect that deployment reduces and the scarce human resources of an economy resulting to an inward shift in its PPF, this does not hold in the Philippine manufacturing sector. However, we found evidence that **deployment positively yet weakly impacts production in the labor-intensive sector** (at the 10% significance level).

This is not consistent with theory since the emigrating labor may contract the PPF in agriculture. Since deployment has a negative effect on employment, albeit insignificant, reduced employment in agriculture will reduce output in agriculture.

Consistent with Glotis and Mylonas (2022) and Yu et al. (2021), **the impact of wages on employment in the capital-intensive sector is statistically significant yet ambiguous** as evidenced by the varying direction of impact. The negative impact of wages on employment in the labor-intensive sector is consistent with the findings of Neumark (2018) that higher wages discourage firms from hiring the low-wage, low-skill workers suggesting that increase in wages have the tendency to reduce jobs available to low-skill workers.

On one hand, **employment has a statistically insignificant impact on production in the capital-intensive sector.** This anomaly can be traced to the inability of the Philippine manufacturing sector “to provide the dynamic growth push” that the successful, high-flying East Asian economies experienced” (Intal et al., 2008, p. 15) to allow it to contribute more to production. This is worsened by “instabilities” and “institutional weaknesses” that persist in the sector (Williamson & de Dios, 2014, p. 47). On the other hand, **employment has a negative and statistically significant impact on production in the labor-intensive sector**, consistent with Ioan (2014). This can be traced to the low economic performance of the Philippine agricultural sector (Galang, 2019). Meanwhile, the **increase in wages and employment in the capital-intensive sector do not strongly trigger an increase in production**.

That is, the increase in wages and employment in the capital-intensive sector do not strongly trigger an increase in production. This can be explained by the fact that the manufacturing sector, being a capital-intensive sector, will need more capital relative to labor to increase its production. Since labor has increased in the manufacturing sector but was not accompanied by an increase in production, it can be construed that it still lacks the necessary capital to mix with additional labor. That is, labor surplus is not eliminated in the agricultural sector because the manufacturing sector has limited capital to absorb additional employment. For production to expand, the increase in employment arising from deployment must be accompanied by a significant influx of capital.

These findings share alignment with theory and literature suggesting that deployment impacts wages (Elsner 2022, 2015; Koczan et al., 2021; Vargas-Silva, 2020; Brown, 2015; Docquier et al., 2010), which in turn ambiguously affects employment (Glotis & Mylonas, 2022; Yu et al., 2021; Neumark, 2018), which in turn positively affects production on the condition that “employment growth involves both a high economic performance, expressed mainly by the high level of work performance and especially the development and diversification of the services sector” (Ioan, 2014, p. 268).

Table 9 presents the VAR estimates of Equation 3 indicating the impact of remittances on wages, employment, and production in the capital- and labor-intensive sectors of the Philippines.

Table 9: Summary VAR(p) Results for Equation 3

Capital-intensive sector				Labor-intensive sector			
Impulse	**Response**	**Coefficient**	***p***	**Impulse**	**Response**	**Coefficient**	***p***
L1.D1.ln$REMIT_t$	D1.$WMNFG_t$	-23.1370	0.0170	L1.D1.ln$REMIT_t$	D1.$WAGRI_t$	-20.9544	0.012
L2.D1.ln$REMIT_t$		-7.0951	0.4170	L2.D1.ln$REMIT_t$		8.3882	0.157
L3.D1.ln$REMIT_t$		-0.9710	0.9240	L3.D1.ln$REMIT_t$		1.6342	0.772
L4.D1.ln$REMIT_t$		6.9091	0.4670	L4.D1.ln$REMIT_t$		-4.3845	0.431
L1.D1.ln$REMIT_t$	D1.$EMNFG_t$	-210,438.2	0.4430	L1.D1.ln$REMIT_t$	D1.$EAGRI_t$	-974,920.1	0.058
L2.D1.ln$REMIT_t$		345,478.6	0.1610	L2.D1.ln$REMIT_t$		-59,779.81	0.871
L3.D1.ln$REMIT_t$		-703,562.9	0.0150	L3.D1.ln$REMIT_t$		-849,121.2	0.015
L4.D1.ln$REMIT_t$		229,433.8	0.3920	L4.D1.ln$REMIT_t$		1,500,874	0.000
L1.D1.ln$REMIT_t$	D1.$PMNFG_t$	-2.29e+07	0.1830	L1.D1.ln$REMIT_t$	D1.$PAGRI_t$	2618805	0.668
L2.D1.ln$REMIT_t$		-5,555,346	0.7190	L2.D1.ln$REMIT_t$		-1350566	0.756
L3.D1.ln$REMIT_t$		-1.28e+07	0.4810	L3.D1.ln$REMIT_t$		-8434784	0.042
L4.D1.ln$REMIT_t$		-2.73e+07	0.1040	L4.D1.ln$REMIT_t$		-2066286	0.613
L1.D1.$WMNFG_t$	D1.$EMNFG_t$	14,386.62	0.0220	L1.D1.$WAGRI_t$	D1.$EAGRI_t$	-71263.61	0.000
L2.D1.$WMNFG_t$		-13,015.62	0.0360	L2.D1.$WAGRI_t$		-27882.58	0.165
L3.D1.$WMNFG_t$		15,874.52	0.0030	L3.D1.$WAGRI_t$		33653.44	0.075
L4.D1.$WMNFG_t$		-26,670.89	0.0000	L4.D1.$WAGRI_t$		47475.92	0.039
L1.D1.$EMNFG_t$	D1.$PMNFG_t$	17.1189	0.2920	L1.D1.$EAGRI_t$	D1.$PAGRI_t$	-5.102439	0.009
L2.D1.$EMNFG_t$		31.2314	0.0670	L2.D1.$EAGRI_t$		.6963282	0.777
L3.D1.$EMNFG_t$		12.1717	0.5340	L3.D1.$EAGRI_t$		-5.455042	0.003
L4.D1.$EMNFG_t$		-6.2320	0.7320	L4.D1.$EAGRI_t$		-2.229855	0.272

Note: See Appendix 4.1 and Appendix 4.2 for the full VAR(p) estimated results; shaded areas indicate statistical significance at least at the 10% alpha.
Source: Computed by the authors.

There is evidence that remittances decrease wages and employment in the capital- and labor-intensive sectors. This is one of the controversies surrounding remittances, its accompanying distortions, and its capacity to trigger dependency on its recipients. According to Amuedo-Dorantes and Pozo (2023), remittances can alleviate budget constraints, raise reservation wages, reduce the employment likelihood and hours worked by recipients, raise its recipients' opportunity cost of leisure resulting to lower labor supply. For Chami et al. (2018), there is also evidence that remittances reduce overall unemployment, but this holds for lower-wage, lower-productivity non-tradable industries at the expense of high-productivity, high-wage tradable sectors. Hence, even though inequality declines because of larger remittances, average wage still declines.

The negative relationship between remittances and employment in the capital- and labor-intensive sectors is a counterintuitive result. While there is concurrence in scholarly literature that labor emigration can prompt the increase in employment in the sending-economy (Kupets, 2012; Asch, 1994), our empirical results from the Philippines say otherwise. This can be explained by distinguishing the direct and indirect effect of labor emigration on employment and production. On one hand, the direct effect of labor emigration on production is through a reduction in labor supply. On the other hand, the indirect effect of labor emigration on employment is through remittances via an increase in the reservation wage and increase demand for education of those who receives remittances. These result to lower labor force participation. Hence, lower employment reduces production in the agricultural sector. Eventually, reduced production will decrease both labor demand and wages.

The impact of remittances on production is statistically insignificant in the capital-intensive sector. Since the manufacturing sector is capital-intensive, the change in employment is not a sufficient factor to increase output. It must be accompanied by a significant increase in capital to warrant an increase in output. However, the impact of remittances on production in the labor-intensive sector is negative and statistically significant. Consistent with theory and literature particularly Wonyra and Ametoglo (2020) and Al Mamun et al. (2016, 2015), this is due to the reduction in employment given increased remittances.

Like our results in Table 8, consistent with Glotis and Mylonas (2022) and Yu et al. (2021), our results on **the impact of wages on employment in the capital- and labor-intensive sector are statistically significant yet ambiguous** as evidenced by the varying direction of impact.

Meanwhile, **employment has a positive and statistically significant impact on production in the capital-intensive sector**, as demand for manufactured goods increase (de Vera, 2022). However, **employment has a negative and statistically significant impact on production in the labor-intensive sector**, consistent with Ioan (2014). This can be traced to the low economic performance of the Philippine agricultural sector (Galang, 2019).

From Tables 8 and 9, we can already see results that support and challenge theory and scholarly literature. For instance, in Table 9, the negative effect of remittances on employment lower production in agriculture, which is consistent with theory. From Table 8, although deployment affects agricultural production negatively, **the sending of remittances may reduce employment and production in agriculture that may be construed as non-inclusive**. Hence, there is evidence that remittances are not inclusive for the labor-intensive sector because it reduces employment due to the enhanced reservation wage of workers receiving remittances. The decline in employment will reduce production in the agricultural sector. The reduced agricultural output will decrease labor demand, which in turn will reduce wages.

Table 10 presents the VAR estimates of Equation 4 showing the impact of FDI flows on wages, employment, and production in the capital- and labor-intensive sectors of the Philippines.

Table 10: Summary VAR(p) Results for Equation 4

Capital-intensive sector				Labor-intensive sector			
Impulse	**Response**	**Coefficient**	***p***	**Impulse**	**Response**	**Coefficient**	***p***
L1.D1.ln$FDIFL_t$	D1.$WMNFG_t$	4.268616	0.0430	L1.D1.ln$FDIFL_t$	D1.$WAGRI_t$	-.6161584	0.6440
L2.D1.ln$FDIFL_t$		-1.157731	0.5820	L2.D1.ln$FDIFL_t$		2.80959	0.0210
L3.D1.ln$FDIFL_t$		3.913777	0.0150	L3.D1.ln$FDIFL_t$		1.351671	0.1970
L4.D1.ln$FDIFL_t$		3.262013	0.0510	L4.D1.ln$FDIFL_t$		-.7828653	0.5010
L1.D1.ln$FDIFL_t$	D1.$EMNFG_t$	143675.3	0.0200	L1.D1.ln$FDIFL_t$	D1.$EAGRI_t$	-296767.7	0.0030
L2.D1.ln$FDIFL_t$		146157.5	0.0180	L2.D1.ln$FDIFL_t$		-116368.6	0.1950
L3.D1.ln$FDIFL_t$		88026.75	0.0630	L3.D1.ln$FDIFL_t$		-85226.83	0.2710
L4.D1.ln$FDIFL_t$		86623.5	0.0780	L4.D1.ln$FDIFL_t$		64740.26	0.4510
L1.D1.ln$FDIFL_t$	D1.$PMNFG_t$	1.35e+07	0.0000	L1.D1.ln$FDIFL_t$	D1.$PAGRI_t$	228206.1	0.7950
L2.D1.ln$FDIFL_t$		4225096	0.2060	L2.D1.ln$FDIFL_t$		-1283553	0.1100
L3.D1.ln$FDIFL_t$		3909871	0.1270	L3.D1.ln$FDIFL_t$		532704.3	0.4410
L4.D1.ln$FDIFL_t$		1262684	0.6340	L4.D1.ln$FDIFL_t$		-2431896	0.0020
L1.D1.$WMNFG_t$	D1.$EMNFG_t$	21368.35	0.0000	L1.D1.$WAGRI_t$	D1.$EAGRI_t$	-66618.18	0.0000
L2.D1.$WMNFG_t$		-2767.643	0.6590	L2.D1.$WAGRI_t$		-25828.96	0.2170
L3.D1.$WMNFG_t$		16285.12	0.0020	L3.D1.$WAGRI_t$		34825.35	0.0990
L4.D1.$WMNFG_t$		-21446.88	0.0010	L4.D1.$WAGRI_t$		46299.11	0.0730
L1.D1.$EMNFG_t$	D1.$PMNFG_t$	-19.45752	0.1750	L1.D1.$EAGRI_t$	D1.$PAGRI_t$	-7.799005	0.0000
L2.D1.$EMNFG_t$		-2.861573	0.8570	L2.D1.$EAGRI_t$		2.960251	0.1390
L3.D1.$EMNFG_t$		-18.29095	0.2390	L3.D1.$EAGRI_t$		-8.79403	0.0000
L4.D1.$EMNFG_t$		-23.46919	0.1260	L4.D1.$EAGRI_t$		2.662858	0.1950
L1.D1.$WMNFG_t$	D1.ln$FDIFL_t$	.0048315	0.8320	L1.D1.$WAGRI_t$	D1.ln$FDIFL_t$	.005753	0.8490
L2.D1.$WMNFG_t$		-.0157554	0.5440	L2.D1.$WAGRI_t$		-.0044584	0.9090
L3.D1.$WMNFG_t$		.0037828	0.8590	L3.D1.$WAGRI_t$		.0000598	0.9990
L4.D1.$WMNFG_t$		.0124362	0.6500	L4.D1.$WAGRI_t$		.0640808	0.1820

L1.D1.$EMNFG_t$	D1.ln$FDIFL_t$	1.51e-07	0.8910	L1.D1.$EAGRI_t$	D1.ln$FDIFL_t$	-3.14e-07	0.3900
L2.D1.$EMNFG_t$		7.49e-07	0.5370	L2.D1.$EAGRI_t$		-3.77e-07	0.3650
L3.D1.$EMNFG_t$		9.53e-07	0.4230	L3.D1.$EAGRI_t$		1.35e-06	0.0000
L4.D1.$EMNFG_t$		-2.39e-07	0.8390	L4.D1.$EAGRI_t$		4.47e-07	0.2960

Note: See Appendix 5.1 and Appendix 5.2 for the full VAR(p) estimated results; shaded areas indicate statistical significance at least at the 10% alpha.
Source: Computed by the authors.

There is evidence that **FDI flows have a positive and statistically significant impact on wages in both capital- and labor-intensive sectors**. This is consistent with theory stating that FDI flows will increase wages because of an increase in labor demand as the production of labor is enhanced with more productive inputs. This is also consistent with the findings of Saucedo et al. (2020) and Arnal and Hijzen (2008).

FDI flows have also demonstrated a positive and statistically significant relationship with employment in the capital-intensive sector. This is consistent with theory stating that FDI flows create positive effect in both low- and high-skilled employment. This is also aligned with the results of Kang and Martinez-Vasquez (2022); Pieńkowski (2020); Saucedo et al. (2020); Estrin (2017); Brincikova and Darmo (2014); and Rizvi and Nishat (2009). This can also be explained by the fact that most FDI flows in the Philippines are directed to the manufacturing sector (Medina, 2023; Cuaresma, 2019). In fact, according to Avrett (2023), “majority of FDI equity investments in 2022 targeted the manufacturing, information and communications technology (ICT), financial services, and real estate sectors” (para. 1).

However, **FDI flows manifested a negative and statistically significant relationship with employment in the labor-intensive sector**. This is because labor inputs have become more expensive with higher wages. While this is not consistent with theory and scholarly literature, it can be traced to the fact that most FDI flows to the Philippines go to capital-intensive sectors (Medina, 2023; Cuaresma, 2019) that increases its production. Because the labor-intensive sectors are protected from foreign participation (Laforga, 2021; Talavera, 2021), the implications of the Lewis’ model of structural change (Todaro & Smith, 2014) sets in wherein surplus labor from the labor-intensive sector moves to the capital-intensive sector due to better wages and living standards. Hence, production in the labor-intensive sector also declines.

It is also important to note that the positive impacts of FDI flows is more pronounced in the capital-intensive sector. **FDI flows evidently increase wages, employment, and production in the capital-intensive sector**. This is due to the relative size of foreign firms who are usually larger, more capital- and input-intensive. They are also more integrated with the foreign markets than domestic firms. Thus, their greater sophistication increases labor productivity and production (e.g., export performance) (Desbordes & Franssen, 2019). However, this is not the case for the labor-intensive sector, with certain lags indicating statistically insignificant effect. This indicates that at certain points in time, changes on such variables in the agricultural sector may not be an automatic consequence of FDI (Blomström, 2001) and delayed effects also play a role. Effects of FDI flows take time to manifest in the host economy. The limited capabilities, weak competitiveness, and inability to absorb technology by the agricultural sector in the Philippines further slows down the expected spillover effects of FDI flows (Aldaba, 2022).

Worse, even **FDI appears to be damaging for agriculture because it reduces not only employment but also production**. According to Loungani and Razin (2001), “FDI is not only a transfer of ownership from domestic to foreign residents but also a mechanism that makes it possible for foreign investors to exercise management and control over host country firms” (para. 17). Thus, transfer of control is not necessarily beneficial for the FDI-recipient economy due to country-specific circumstances, issues of adverse selection, and excessive leverage.

Like results in Tables 8 and 9, consistent with Glotis and Mylonas (2022) and Yu et al. (2021), the **impact of wages on employment in the capital- and labor-intensive sectors is statistically significant yet ambiguous** as evidenced by the varying direction of impact.

Meanwhile, **employment has no statistically significant impact on production in the capital-intensive sector**. Like in Table 8, this is because the positive impact of wages on employment is weakened in manufacturing with mixed results. Also, the manufacturing sector requires more capital to increase its production. Hence, production directly benefits from FDI flows and not necessarily through employment. That is, without capital to work on, employment alone will not increase manufacturing output.

However, **employment has a negative and statistically significant impact on production in the labor-intensive sector**. Consistent with theory, production in agriculture will decrease with a decline in employment. This is also aligned with Ioan (2014) wherein the low economic performance of the Philippine agricultural sector (Galang, 2019) explains low production.

Table 11 presents the VAR estimates of Equation 5 indicating the feedback effects between FDI flows and production in the capital- and labor-intensive sectors of the Philippines.

Table 11: Summary VAR(p) Results for Equation 5

Capital-intensive sector				Labor-intensive sector			
Impulse	**Response**	**Coefficient**	***p***	**Impulse**	**Response**	**Coefficient**	***p***
L1.D1.$PMNFG_t$	D1.ln$FDIFL_t$	-3.02e-10	0.9700	L1.D1.$PAGRI_t$	D1.ln$FDIFL_t$	1.68e-08	0.6200
L1.D1.$PMNFG_t$		2.51e-08	0.1970	L2.D1.$PAGRI_t$		-3.26e-08	0.2910
L1.D1.$PMNFG_t$		-1.36e-08	0.3960	L1.D1.$PAGRI_t$		4.08e-08	0.2040
L1.D1.$PMNFG_t$		-9.73e-09	0.6700	L2.D1.$PAGRI_t$		-1.69e-08	0.6320

Note: See Appendix 5.1, Appendix 5.2, Appendix 6.1 (reported above), and Appendix 6.2 (reported above) for the full VAR(p) estimated results; shaded areas indicate statistical significance at least at the 10% alpha.
Source: Computed by the authors.

Following results in Table 10, **production in the capital-intensive sector has a positive response to FDI flows while production in the labor-intensive sector has a negative response to FDI flows**, the feedback effect shows statistical insignificance. **Production in the capital- and labor-intensive sectors does not explain FDI flows**. However, Santos (2023); Jimenez et al. (2021); and Jung (2020) found that production positively impacts FDI flows.

Our results are counterintuitive with theory and literature because from Table 10, **wage and employment in the capital-intensive sector do not significantly affect FDI flows**. **In the labor-intensive sector, employment has a positive yet negligible effect on FDI flows**. This can be traced to the fact that developing economies like the Philippines, despite having relaxed Constitutional constraints on foreign entry, still has economic barriers to FDI and risks that discourage entry (Diola, 2022). That is, FDI flows are not automatic consequences of production, wages, or employment levels but more of the state of investment landscape.

Beyond production, the Philippines must enhance its overall investment climate through resilient macroeconomic fundamentals, robust and investment grade sovereign credit ratings, stable political situation, among others.

While not measured in our VAR model, the Philippines has been making strides to enhance its investment climate through the following initiatives: (1) enacted the Ease of Doing Business Law that aims to entice investors to setup businesses in the Philippines by expediting business and non-business transactions; (2) amended the Public Services Act, Retail Trade Liberalization Act, and Foreign Investment Act that addressed foreign ownership limitations and high capitalization requirements that has constrained investment in many critical sectors; (3) continued aggressive investment in infrastructure spending to enhance mobility and connectivity in the economy; and (4) strengthened its commitments in the ASEAN Economic Community (AEC) and ratified its membership in bigger regional trading bloc like the Regional Comprehensive Economic Partnership (RCEP). All of which creates a conducive environment for foreign investors that will pull them to invest in the Philippines.

4.2.2. OIRF and FEVD Results

FEVD and OIRF for Equation 2. Figures 4a and 4b illustrate the OIRFs (left panels) and FEVDs (right panels) for Equation 2. Figure 4a shows the response of $WMNFG_t$, $EMNFG_t$, and $PMNFG_t$ to impulse emanating from $DEPLY_t$. Meanwhile, Figure 4b shows the response of $WAGRI_t$, $EAGRI_t$, and $PAGRI_t$ to impulse emanating from $DEPLY_t$.

- On one hand, in Figure 4a (first row, left panel), the OIRF illustrates the response of wages in the manufacturing sector to impulses from deployment. With a positive shock from deployment at $t = 0$, wages would respond positively until about until $t = 8$ when response would be negative. Impulses are not fully absorbed by the economy and reaction does not completely dissipate. Holding other factors constant, **the impact of deployment on wages in the manufacturing sector is mostly positive and persistent in succeeding periods**.
- In Figure 4a (first row, right panel), the FEVD shows that variations (movements) in wages in the manufacturing sector caused by deployment start instantaneously and sharply at $t = 0$ with an upward yet steep for succeeding periods. That is, **variations to wages in the manufacturing sector attributed to deployment are consistently positive and happen immediately**.

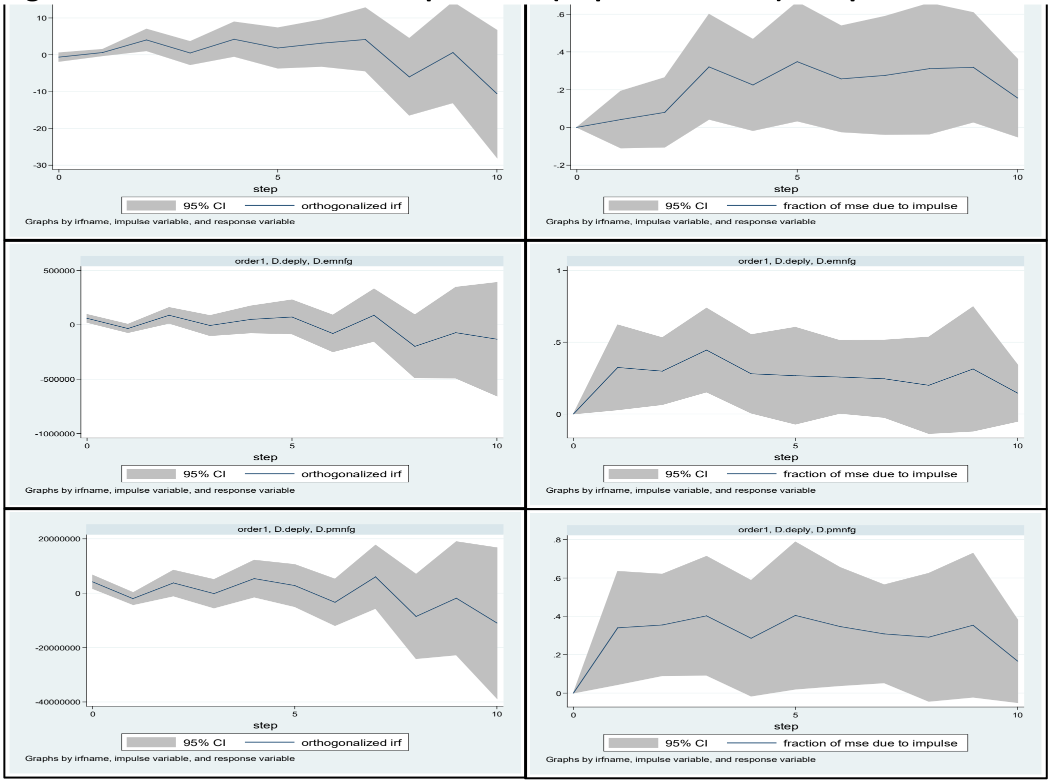
The abovementioned findings are **supportive of our VAR estimates that deployment increases wages in the capital-intensive sector**. Because deployment reduces labor supply given domestic demand for labor, it will trigger a wage increase in both sectors.

- In Figure 4a (second row, left panel), the OIRF illustrates the response of employment in the manufacturing sector to impulses from deployment. With a positive shock from deployment at $t = 0$, employment responds ambiguously oscillating between positive and negative, and persists across time. Impulses are not fully absorbed by the economy and reaction does not completely dissipate. Holding other factors constant, **the impact of deployment on employment in the manufacturing sector is mostly positive and persistent in succeeding periods**.

- In Figure 4a (second row, right panel), the FEVD shows that variations in employment in the manufacturing sector caused by deployment start instantaneously and sharply at *t* = 0 with an upward and steady trajectory for succeeding periods. That is, **variations in employment in the manufacturing sector attributed to deployment are consistently positive and happen immediately**.

The abovementioned findings are **supportive of our VAR estimates that deployment increases employment in the capital-intensive sector**. A decline in labor supply due to deployment will increase employment in the capital-intensive sector under the assumption that emigrating labor is from the labor-intensive sector.

Figure 4.1: OIRF and FEVD for Equation 2 (Impulse: DEPLYt) – Capital-Intensive



- In Figure 4a (third row, left panel), the OIRF illustrates the response of production in the manufacturing sector to impulses from deployment. With a positive shock from deployment at *t* = 0, the response of production starts positive then oscillates between positive and negative until it settles in the negative in latter periods. Impulses are not fully absorbed by the economy and reactions do not dissipate. Holding other factors constant, **the impact of deployment on production is ambiguous and persistent in succeeding periods**.
- In Figure 4a (third row, right panel), the FEVD shows that variations in production in the manufacturing sector caused by deployment start instantaneously and sharply at *t* = 0 with an upward yet steady trajectory for succeeding periods. That is, **variations to production in the manufacturing sector attributed to deployment are consistently positive and happen immediately**.

The abovementioned findings **supports the statistical insignificance of the relationship between deployment and production in our VAR results**. We emphasize that because the manufacturing sector is capital-intensive, the increase in employment must be accompanied by a significant increase in capital to warrant an increase in production.

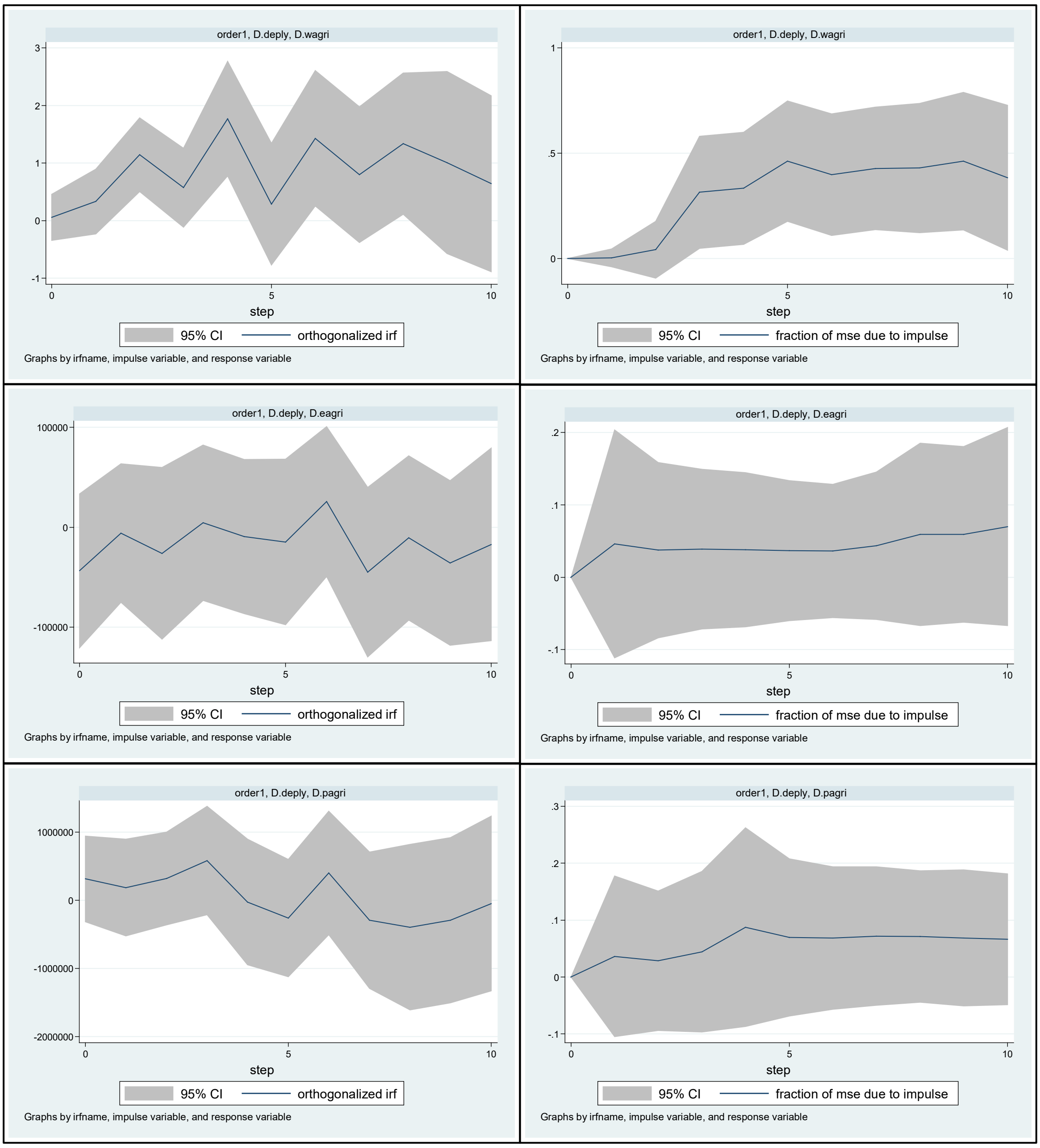
- On the other hand, in Figure 4b (first row, left panel), the OIRF illustrates the response of wages in the agricultural sector to impulses from deployment. With a positive shock from deployment at $t = 0$, the response of wages is consistently positive and persistent across time. Impulses are not fully absorbed by the economy and reactions do not dissipate. Holding other factors constant, **the impact of deployment on wages in the agricultural sector is consistently positive and persistent in succeeding periods**.
- In Figure 4b (first row, right panel), the FEVD shows that variations in wages in the agricultural sector caused by deployment also start instantaneously and becomes steeper at succeeding periods. That is, **variations to wages in the agricultural sector attributed to deployment happen immediately, slowly gain steam, and steeply rise in succeeding periods**.

The abovementioned findings are supportive of our VAR estimates that **deployment also increases wages in the labor-intensive sector**. Because deployment reduces labor supply given domestic demand for labor, it will trigger a wage increase in both sectors. Indeed, labor emigration has economic and financial benefits to those left behind.

- In Figure 4b (second row, left panel), the OIRF illustrates the response of employment in the agricultural sector to impulses from deployment. With a positive shock from deployment at $t = 0$, the response of employment is mostly negative and persists over time. Impulses are not fully absorbed by the economy and reactions do not dissipate. Holding other factors constant, **the impact of deployment on employment in the agricultural sector is mostly negative and persistent in succeeding periods**.
- In Figure 4b (second row, right panel), the FEVD shows that variations in employment in the agricultural sector caused by deployment start instantaneously at $t = 0$ with an upward yet flat trajectory for succeeding periods. That is, **variations to employment in the agricultural sector attributed to deployment are instantaneous and consistently positive**.

The abovementioned findings are **supportive of the sign of our VAR estimates that deployment reduces employment in the labor-intensive sector, albeit statistically insignificant**. This is because the positive effect of an increase in wage rate on employment is offset by the reduction of labor due to deployment.

Figure 4.2: OIRF and FEVD for Equation 2 (Impulse: DEPLYt) – Labor-Intensive

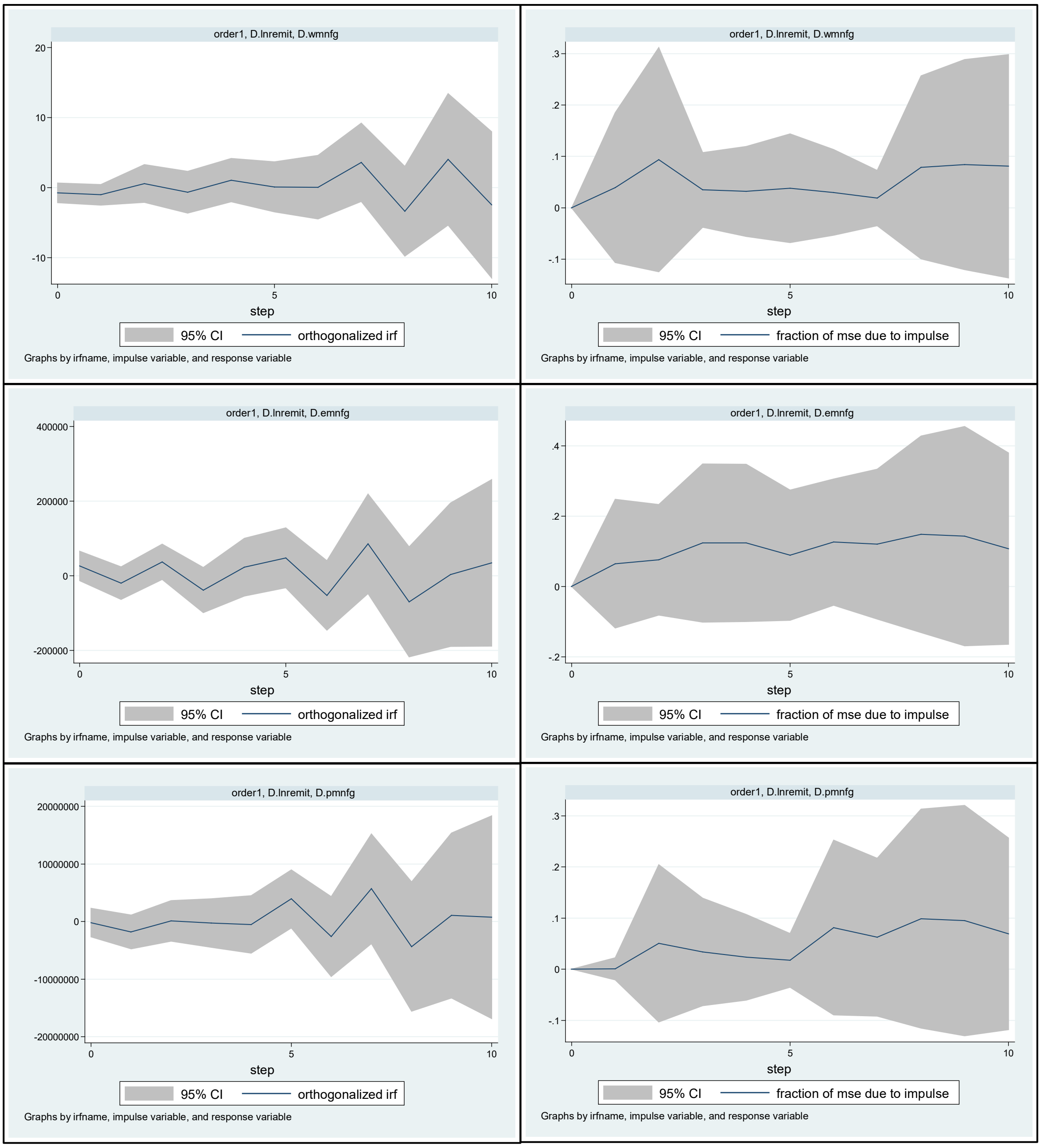


- In Figure 4b (third row, left panel), the OIRF illustrates the response of production in the agricultural sector to impulses from deployment. With a positive shock from deployment at t = 0, the response of production in the agricultural sector is mostly positive despite hovering around the positive and negative space across time. Impulses from deployment are not absorbed by the economy and responses do not dissipate. Holding other factors constant, **the impact of deployment on production in the agricultural sector is mostly positive and persistent in succeeding periods**.
- In Figure 4b (third row, right panel), the FEVD shows that variations in production in the agricultural sector caused by deployment start instantaneously and flatly at t = 0 with an upward and steep trajectory for succeeding periods. That is, **variations to production in the agricultural sector attributed to deployment are instantaneous and consistently positive**.

The abovementioned findings are **supportive of our VAR estimates indicating a positive statistically significant relationship between deployment and production in the agricultural sector**. For a stronger response, production growth driven by greater employment should involve a high economic performance, expressed mainly by the high level of work performance and development of the sector.

FEVD and OIRF for Equation 3. Figures 5a and 5b illustrate the OIRFs (left panels) and FEVDs (right panels) for Equation 3. Figure 5a shows the response of $WMNFG_t$, $EMNFG_t$, and $PMNFG_t$ to impulse emanating from ln$REMIT_t$. Meanwhile, Figure 5b shows the response of $WAGRI_t$, $EAGRI_t$, and $PAGRI_t$ to impulse emanating from ln$REMIT_t$.

Figure 5.1: OIRF and FEVD for Equation 3 (Impulse: lnREMITt) – Capital-Intensive



- On one hand, in Figure 5a (first row, left panel), the OIRF illustrates the response of wages in the manufacturing sector to impulses from remittances. With a positive shock from remittances at $t = 0$, wages respond flatly across time except in the latter period where responses are more pronounced at the negative. Impulses are not absorbed by the economy and responses do not dissipate. Holding other factors constant, **the impact of remittances on wages in the manufacturing sector is negative, which persists in the succeeding periods**.
- In Figure 5a (first row, right panel), the FEVD shows that variations in wages in the manufacturing sector caused by remittances start instantaneously and sharply at $t = 0$ with a positive yet flat trajectory for succeeding periods. That is, **variations to wages in the manufacturing sector attributed to remittances is consistently positive, instantaneous, and relatively flat in succeeding time periods**.

The abovementioned findings are **supportive of our VAR estimates that remittances have a negative relationship with wages.** While remittances reduce overall unemployment and inequality, average wage declines because the benefits of remittances mostly accrue to lower-wage, lower-productivity non-tradable industries at the expense of high-productivity, high-wage tradable sectors.

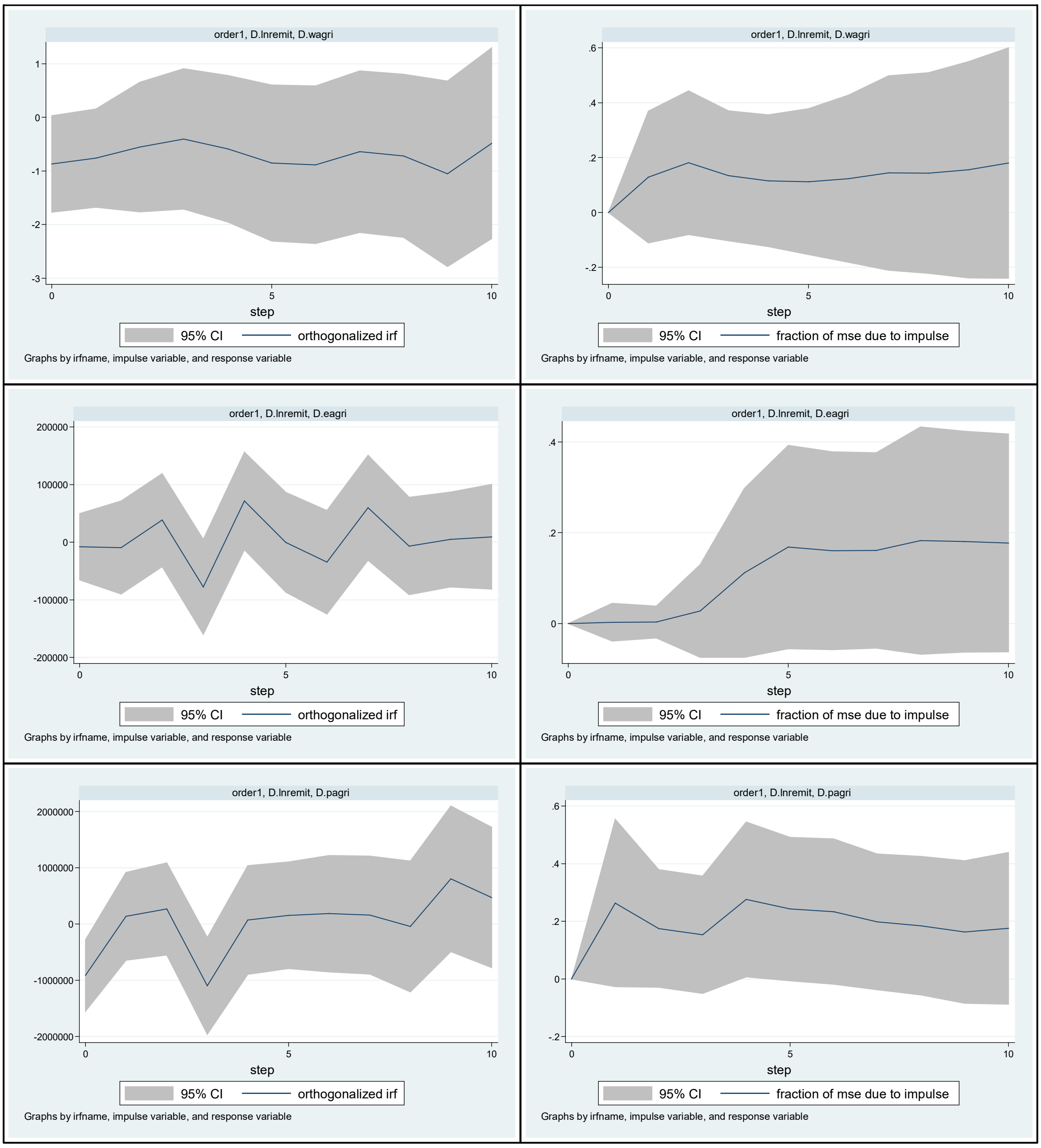
- In Figure 5a (second row, left panel), the OIRF illustrates the response of employment in the manufacturing sector to impulses from remittances. With a positive shock from remittances at $t = 0$, the response of employment in the manufacturing sector is mostly negative and persists over time. Impulses are not absorbed by the economy and responses do not dissipate. Holding other factors constant, **the impact of remittances on employment is negative and is persistent in succeeding periods**.
- In Figure 5a (second row, right panel), the FEVD shows that variations in employment in the manufacturing sector caused by remittances start instantaneously and sharply at $t = 0$ with an upward yet slow and flat trajectory for succeeding periods. That is, **variations to employment in the manufacturing sector attributed to remittances are consistently positive and instantaneous**.

The abovementioned findings are **supportive of our VAR estimates that remittances reduce employment in the capital-intensive sector**. This can be traced to the distortions caused by remittances in increasing reservation wage and demand for education resulting to lower labor force participation.

- In Figure 5a (third row, left panel), the OIRF illustrates the response of production in the manufacturing sector to impulses from remittances. With a positive shock from remittances at $t = 0$, the response of production in the manufacturing sector is ambiguous oscillating between the positive and negative space over time. Impulses from remittances are not absorbed by the economy and response do not dissipate. Holding other factors constant, **the impact of remittances on production is ambiguous and persistent in the succeeding periods**.
- In Figure 5a (third row, right panel), the FEVD shows that variations in production in the manufacturing sector caused by remittances is flat at $t = 0$ with a sudden upward and steep trajectory for succeeding periods, which would eventually settle at a higher level. That is, **variations to production in the manufacturing sector attributed to remittances are consistently positive and are manifested with a delay**.

The abovementioned findings are **supportive of our VAR estimates that the relationship between remittances and production is statistically insignificant.** While remittances can enhance the welfare of households left behind and boost growth rates of remittance-recipient countries, it also creates a culture of dependency that reduces labor force participation in remittance-recipient economies that slows down production.

Figure 5.2: OIRF and FEVD for Equation 3 (Impulse: lnREMITt) – Labor-Intensive



- On the other hand, in Figure 5b (first row, left panel), the OIRF illustrates the response of wages in the agricultural sector to impulses from remittances. While a positive shock from remittances at $t = 0$, the response of wages in the agricultural sector is negative and is consistently negative and persistent across time. Impulses are not fully absorbed by the economy and responses do not dissipate. Holding other factors constant, **the impact of remittances on wages is consistently negative, which persists in succeeding periods**.

- In Figure 5b (first row, right panel), the FEVD shows that variations in wages in the agricultural sector caused by remittances start instantaneously and sharply at $t = 0$ then increase at succeeding periods. That is, **variations to wages in the agricultural sector attributed to remittances are consistently positive and instantaneous**.

The abovementioned findings **may be supportive of our VAR estimates that remittances have a negative impact on wages in the agricultural sector**. Despite the capacity of remittances to augment people's income earning capabilities, average wage declines.

- In Figure 5b (second row, left panel), the OIRF illustrates the response of employment in the agricultural sector to impulses from remittances. With a positive shock from remittances at $t = 0$, the response of employment in the agricultural sector starts negatively, oscillates between negative and positive, remains mostly at the negative until latter periods. Impulses are not absorbed by the economy and responses do not dissipate. Holding other factors constant, **the impact of remittances on employment is negative and is persistent in succeeding periods**.
- In Figure 5b (second row, right panel), the FEVD shows that variations in employment in the agricultural sector caused by remittances start instantaneously and positively at $t = 0$ with a steeply upward trajectory that stabilizes in succeeding periods. That is, **variations in employment in the agricultural sector attributed to remittances are consistently positive and instantaneous.**

The abovementioned findings are **supportive of our VAR estimates that remittances reduce employment in the labor-intensive sector**. This can be traced to the distortions caused by remittances in increasing reservation wage and demand for education resulting to lower labor force participation.

- In Figure 5b (third row, left panel), the OIRF illustrates the response of production in the agricultural sector to impulses from remittances. With a positive shock from remittances at $t = 0$, the response of production in the agricultural sector is mostly negative across time. At initial periods, the response of production to shocks from remittances is negative then becomes positive then shifts back to negative only to recover at latter periods. Impulses are not absorbed by the economy and responses do not dissipate. Holding other factors constant, **the impact of remittances on production is mostly negative and persistent in succeeding periods**.
- In Figure 5b (third row, right panel), the FEVD shows that variations in production in the agricultural sector caused by remittances is positive across time periods. That is, **variations to production in the agricultural sector attributed to remittances are consistently positive and instantaneous**.

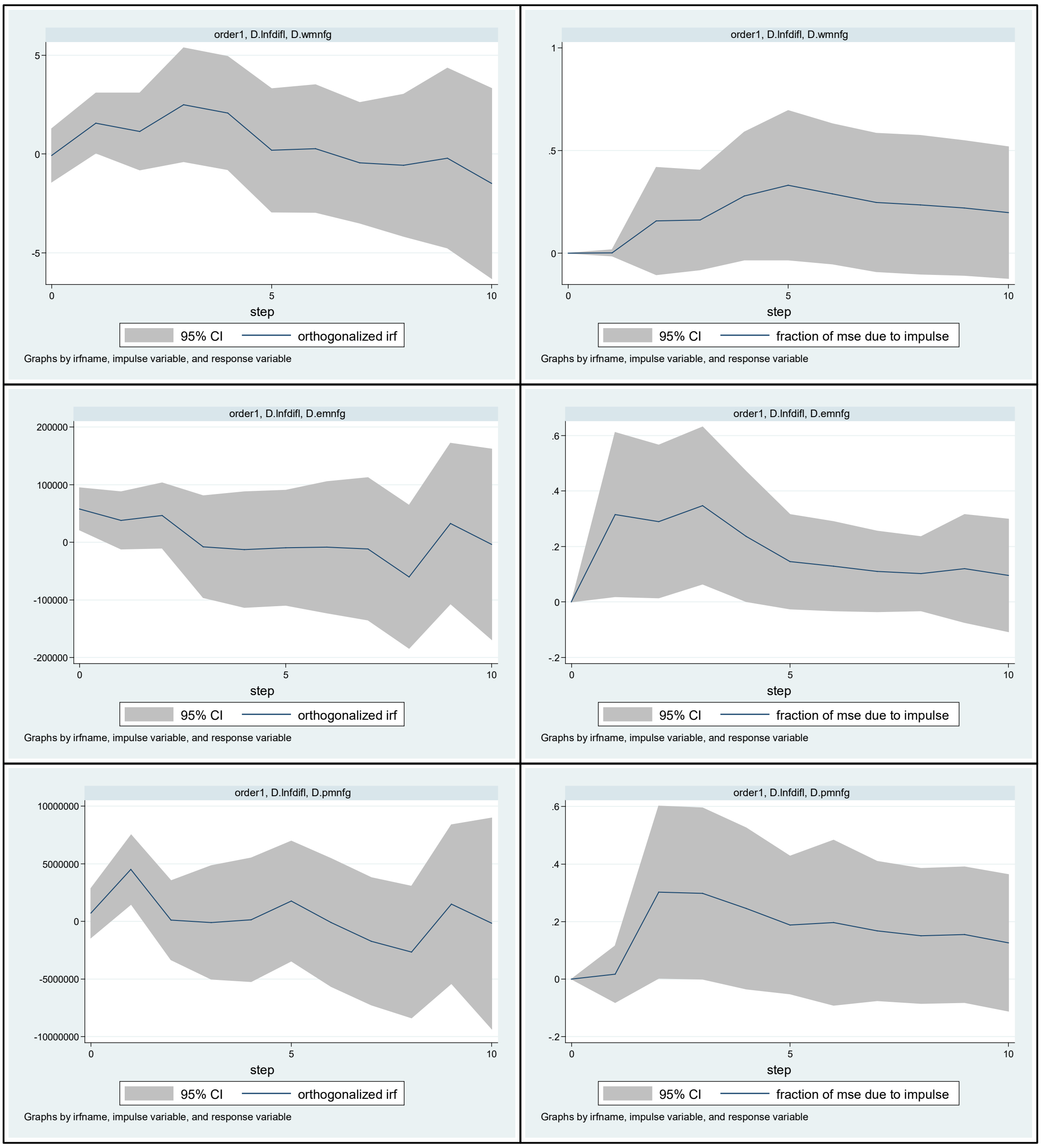
The abovementioned findings are **supportive of our VAR estimates that remittances reduces production in the labor-intensive sector**. While remittances can enhance the welfare of households left behind and boost growth rates of remittance-recipient countries, it also creates a culture of dependency that reduces labor force participation in remittance-recipient economies that slows down production.

FEVD and OIRF for Equation 4. Figures 6a and 6b illustrate the OIRFs (left panels) and FEVDs (right panels) for Equation 3. Figure 6a shows the response of $WMNFG_t$, $EMNFG_t$, and $PMNFG_t$ to impulse emanating from $\ln FDIFL_t$. Meanwhile, Figure 6b shows the response of $WAGRI_t$, $EAGRI_t$, and $PAGRI_t$ to impulse emanating from $\ln FDIFL_t$.

- On one hand, in Figure 6a (first row, left panel), the OIRF illustrates the response of wages in the manufacturing sector to impulses from FDI flows. With a positive shock from FDI flows at $t = 0$, the response of wages is positive and persists across time but shifts to negative in latter periods. Holding other factors constant, **the impact of FDI flows on wages in the manufacturing sector is positive and persistent across time.**
- In Figure 6a (first row, right panel), the FEVD shows that variations in wages in the manufacturing sector caused by FDI flows start slow and flat at $t = 0$. This slow and flat trajectory of variations persist for succeeding periods. That is, **variations to wages in the manufacturing sector attributed to FDI flows is instantaneous yet slow, consistently positive, and stabilizes in succeeding time periods**.

The abovementioned findings **support our VAR estimates that FDI flows have a positive and statistically significant impact on wages**. FDI flows will increase wages because of an increase in labor demand as the production of labor is enhanced with more productive inputs.

Figure 6.1: OIRF and FEVD for Equation 4 (Impulse: lnFDIFLt) – Capital-Intensive



- In Figure 6a (second row, left panel), the OIRF illustrates the response of employment in the manufacturing sector to impulses from remittances. With a positive shock from FDI flows at t = 0, the response of employment in the manufacturing sector is consistently positive and declines across time. Impulses are not absorbed by the economy and responses do not dissipate. Holding other factors constant, **the impact of FDI flows on employment is positive but decline as time progresses**.
- In Figure 6a (second row, right panel), the FEVD shows that variations in employment in the manufacturing sector caused by FDI flows start steep at t = 0 with an upward yet flat trajectory for succeeding periods. That is, **variations to employment in the manufacturing sector attributed to remittances are slow yet consistently positive, and instantaneous**.

The abovementioned findings are **supportive of our VAR estimates indicating a positive and statistically significant impact of FDI flows on employment in the capital-intensive sector**. FDI flows do have a positive contribution to employment. This is because FDI flows facilitate technology transfer through new capital inputs generating employment opportunities accompanied by training that contributes to human capital development in the host country (Loungani & Razin, 2001). However, our results suggest that this impact dissipates thereby necessitating for sustained flow of FDIs so that continuous development can be ensued.

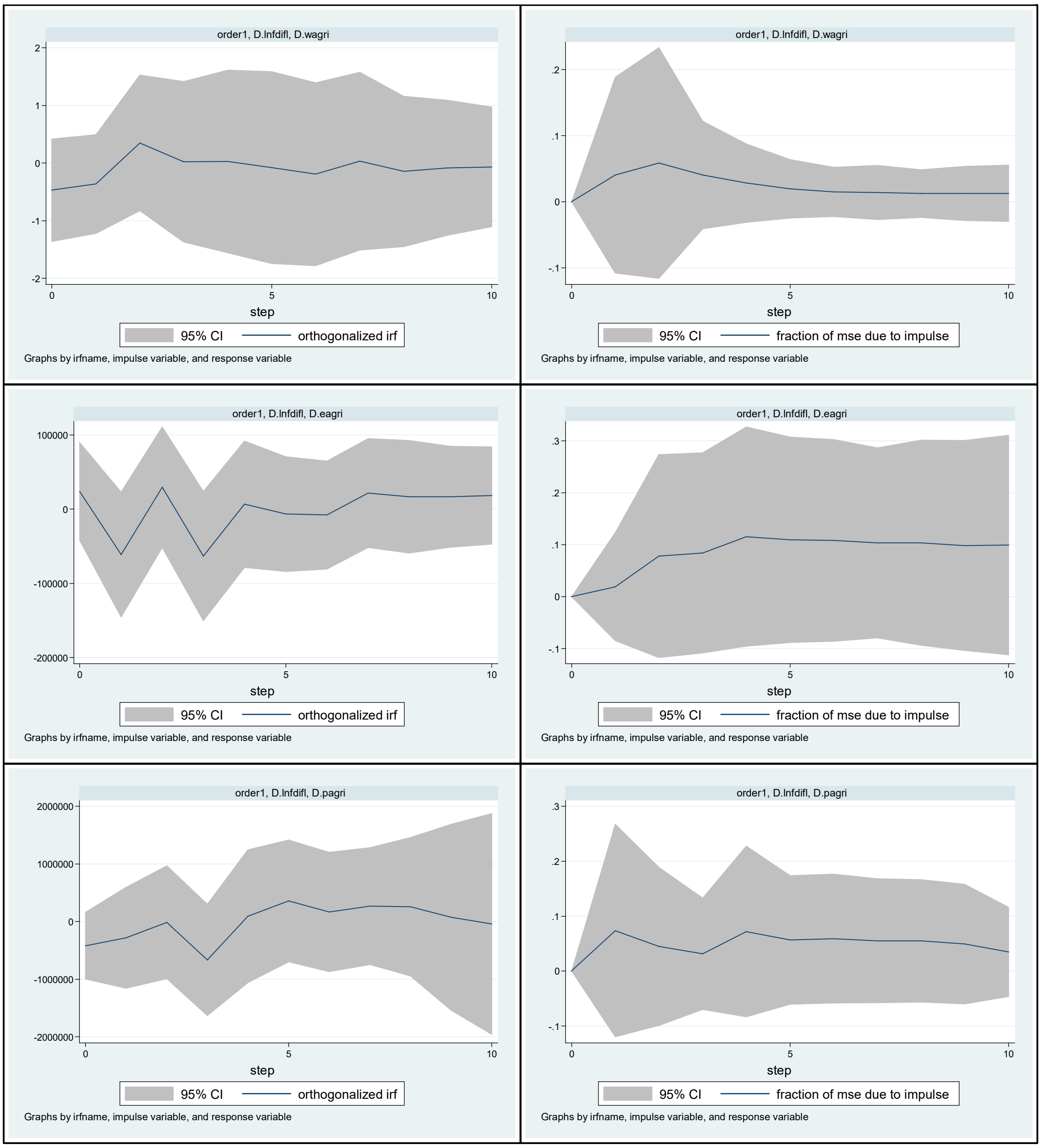
- In Figure 6a (third row, left panel), the OIRF illustrates the response of production in the manufacturing sector to impulses from FDI flows. With a positive shock from FDI flows at t = 0, the response of production in the manufacturing sector is mostly positive at earlier periods then shift to negative in latter periods. Impulses are not absorbed by the economy and responses do not dissipate. Holding other factors constant, **the impact of FDI flows on production is positive and persistent through time.**
- In Figure 6a (third row, right panel), the FEVD shows that variations in production in the manufacturing sector caused by FDI flows is slow at t = 0 with a slight upward trajectory that remains stable for succeeding periods. That is, **variations to production in the manufacturing sector attributed to FDI flows is consistently positive and constant**.

The abovementioned findings may be **supportive of our VAR estimates that FDI flows have a positive impact on production in the capital-intensive sector**. This is due to the relative size of foreign firms who are usually larger, more capital- and input-intensive, and more integrated with the foreign markets than domestic firms allowing them to increase production.

- On the other hand, in Figure 6b (first row, left panel), the OIRF illustrates the response of wages in the agricultural sector to impulses from FDI flows. While a positive shock from FDI flows at t = 0, the response of wages in the agricultural sector is heading towards positive, which it maintains across time. Impulses are not fully absorbed by the economy and responses do not dissipate. Holding other factors constant, **the impact of FDI flows on wages is mostly positive, which persists in succeeding periods**.
- In Figure 6b (first row, right panel), the FEVD shows that variations in wages in the agricultural sector caused by FDI flows start instantaneously and sharply at t = 0 then flattens at succeeding periods. That is, **variations to wages in the agricultural sector attributed to FDI flows are weak but consistently positive and instantaneous, then stagnates**.

The abovementioned findings **are supportive of our VAR estimates that FDI flows have a positive and significant impact on wages in the agricultural sector**. FDI flows will increase wages because of an increase in labor demand as the production of labor is enhanced with more productive inputs.

Figure 6.2: OIRF and FEVD for Equation 4 (Impulse: lnFDIFLt) – Labor-Intensive



- In Figure 6b (second row, left panel), the OIRF illustrates the response of employment in the agricultural sector to impulses from FDI flows. With a positive shock from FDI flows at $t = 0$, the response of employment in the agricultural sector is mostly negative until the latter periods. Impulses are not absorbed by the economy and responses do not dissipate. Holding other factors constant, **the impact of FDI flows on employment is negative and is persistent in succeeding periods**.
- In Figure 6b (second row, right panel), the FEVD shows that variations in employment in the agricultural sector caused by FDI flows start instantaneously and positively at *t*

= 0 with an upward yet slow trajectory for succeeding periods. That is, **variations to employment in the agricultural sector attributed to FDI flows are slow yet consistently positive and instantaneous.**

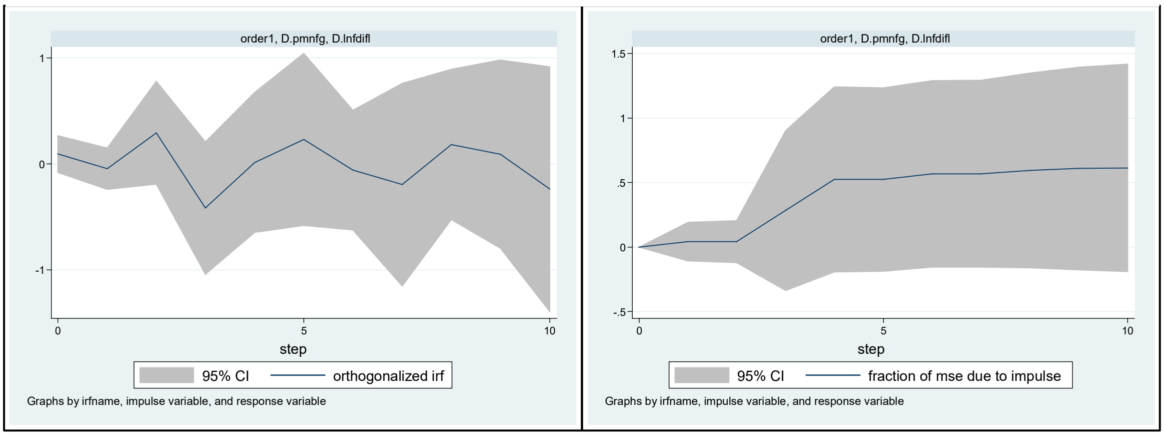
The abovementioned findings are **supportive of our VAR estimates that FDI flows reduce employment in the labor-intensive sector**. This can be traced to the fact that most FDI flows go to capital-intensive sectors and because the labor-intensive sectors are protected from foreign participation.

- In Figure 6b (third row, left panel), the OIRF illustrates the response of production in the agricultural sector to impulses from FDI flows. With a positive shock from FDI flows at $t = 0$, the response of production in the agricultural sector is mostly negative across time. Impulses are not absorbed by the economy and responses do not dissipate. Holding other factors constant, **the impact of FDI flows on production is negative and persistent in succeeding periods**.
- In Figure 6b (third row, right panel), the FEVD shows that variations in production in the agricultural sector caused by FDI flows is positive across time periods. That is, **variations to production in the agricultural sector attributed to FDI flows are consistently positive and instantaneous**.

The abovementioned findings are **supportive of our VAR estimates that FDI flows have a negative and statistically significant impact on production in the labor-intensive sector**. FDI flows are not necessarily beneficial for the labor-intensive sector because of specific circumstances, issues of adverse selection, and excessive leverage.

FEVD and OIRF for Equation 5. Figures 7a and 7b illustrate the OIRFs (left panels) and FEVDs (right panels) for Equation 5. Figure 7a shows the response of ln*FDIFL*$_t$ to impulse emanating from *PMNFG*$_t$ (capital-intensive sector). Meanwhile, Figure 7b shows the response of *lnFDIFL*$_t$ to impulse emanating from *PAGRI*$_t$ (labor-intensive sector).

Figure 7.1: OIRF and FEVD for Equation 4 (Impulse: PMNFGt) – Capital-Intensive



- In Figure 7a (left panel), the OIRF illustrates the response of FDI flows to impulses from production in the manufacturing sector. With a positive shock from production in the manufacturing sector at $t = 0$, the response of FDI flows starts positive but shifts towards negative then positive. Impulses are not absorbed by the economy and
- responses dissipate at latter periods. Holding other factors constant, **the impact of production in the manufacturing sector on FDI flows is ambiguous and persistent across time.**

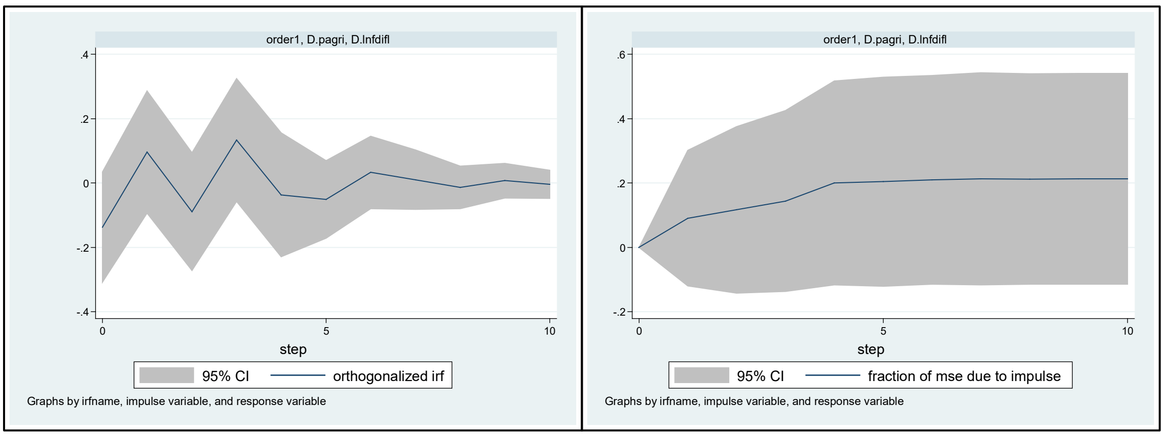
- In Figure 7a (right panel), the FEVD shows that variations in FDI flows caused by production in the manufacturing sector start slow and flat at *t* = 0. This slow and flat trajectory of variations persist for succeeding periods. That is, **variations to FDI flows attributed to production in the manufacturing sector is instantaneous yet slow, consistently positive, and stabilizes in succeeding time periods**.

The abovementioned findings are **supportive of our VAR estimates that production in the manufacturing sector has a statistically insignificant impact on FDI flows**. FDI flows are not automatic consequences of production alone but more of the state of investment landscape in an economy. Beyond production, the Philippines must enhance its overall investment climate through resilient macroeconomic fundamentals, robust and investment grade sovereign credit ratings, stable political situation, among others.

- In Figure 7b (left panel), the OIRF illustrates the response of FDI flows to impulses from production in the agricultural sector. With a positive shock from production in the agricultural sector at *t* = 0, the response of FDI flows spans both positive and negative until impulses are absorbed by the economy and responses dissipate at latter periods. Holding other factors constant, **the impact of production in the agricultural sector on FDI flows is ambiguous but is absorbed by the economy**.
- In Figure 7b (right panel), the FEVD shows that variations in FDI flows caused by production in the agricultural start small, slow, and flat at *t* = 0. Variations are close too small and close to zero indicating insignificant movements. That is, **variations to FDI flows attributed to production in the agricultural sector is instantaneous yet slow, weak, and flatten in succeeding time periods**.

The abovementioned findings are **supportive of our VAR estimates that production in the agricultural sector has a statistically insignificant impact on FDI flows**. FDI flows are not automatic outcomes of production alone but more of the state of investment landscape. Beyond production, the Philippines must enhance its overall investment climate through resilient macroeconomic fundamentals, robust and investment grade sovereign credit ratings, stable political situation, among others.

Figure 7.2: OIRF and FEVD for Equation 4 (Impulse: PAGRIt) – Labor-Intensive



4.3. Key Findings

We have seen mixed results from our VAR, OIRF, and FEVD estimates – results that are consistent with scholarly literature and counterintuitive findings. Our results are summarized in Table 12a for capital-intensive sector and Table 12b for labor-intensive sector.

Table 12: Summary of Empirical Results – Capital-Intensive Sector

Equation	Impulse	Response of Capital-Intensive Sector	Key Findings			Overall Remarks	Consistent with theory	Consistent with literature
			VAR	OIRF	FEVD			
2	Deployment	Wages	+	+	+	Deployment increases wages.	✓	✓
		Employment	+	+	+	Deployment increases employment.	✓	✓
		Production	0	+/-	+	Deployment has no significant impact on production.		
	Wages	Employment	+/-	+/-	+	Wages have an ambiguous impact on employment.		✓
	Employment	Production	0	+/-	+	Employment has no significant impact on production.		
3	Remittances	Wages	-	-	+	Remittances reduce wages.		✓
		Employment	-	-	+	Remittances reduce employment.		✓
		Production	0	+/-	+	Remittances have no significant impact on production.		
	Wages	Employment	+/-	+/-	+	Wages have an ambiguous impact on employment.		✓
	Employment	Production	+	+	+	Employment has positive impact on production.	✓	✓
4	FDI flows	Wages	+	+	+	FDI flows increase wages.	✓	✓
		Employment	+	+	+	FDI flows increase employment.	✓	✓
		Production	+	+	+	FDI flows increase production.	✓	✓

	Wages	Employment	+/-	+/-	+	Wages have an ambiguous impact on employment		✓
	Employment	Production	0	+/-	+	Employment has no significant impact on production.		✓
	Wages	FDI flows	0	+/-	+	Wages has no significant impact on FDI flows.		
	Employment	FDI flows	0	+/-	+	Employment has no significant impact on FDI flows.		
5	Production	FDI flows	0	+/-	+	Production has no significant impact on FDI flows.	✓	

Note: (+) in VAR and in OIRF indicates a significantly positive relationship between the impulse variable and response variable; (–) in VAR and in OIRF indicates a significantly negative relationship between the impulse variable and response variable; (0) in VAR and in OIRF indicates insignificant relationship between the impulse variable and response variable; (+/–) in VAR and in OIRF indicates ambiguous relationship between the impulse variable and response variable; (+) in FEVD indicates that the direction of relationship between the impulse variable and response variables is reinforced.
Source: Compiled by the authors.

Table 13: Summary of Empirical Results – Labor-Intensive Sector

Equation	Impulse	Response of Labor-Intensive Sector	Key Findings			Overall Remarks	Consistent with theory	Consistent with literature
			VAR	OIRF	FEVD			
2	Deployment	Wages	+	+	+	Deployment increases wages.	✓	✓
		Employment	0	-	+	Deployment has no significant impact on employment.		
		Production	+	+	+	Deployment increases production.		
	Wages	Employment	-	-	+	Wages reduce employment.		✓
	Employment	Production	-	-	+	Employment reduces production.		✓
3	Remittances	Wages	-	-	+	Remittances reduce wages.		✓
		Employment	-	-	+	Remittances reduce employment.		
		Production	-	-	+	Remittances reduce production.	✓	✓

	Wages	Employment	+/-	+/-	+	Wages have an ambiguous impact on employment.		✓
	Employment	Production	-	-	+	Employment reduces production.		✓
	FDI flows	Wages	+	+	+	FDI flows increase wages.	✓	✓
		Employment	-	-	+	FDI flows reduce employment.	✓	✓
		Production	-	-	+	FDI flows reduce production.		
4	Wages	Employment	+/-	+/-	+	Wages have an ambiguous impact on employment		✓
	Employment	Production	-	-	+	Employment reduces production.	✓	✓
	Wages	FDI flows	0	+/-	+	Wages has no significant impact on FDI flows.		
	Employment	FDI flows	+	+	+	Employment increases FDI flows.	✓	✓
5	Production	FDI flows	0	+/-	+	Production has no significant impact on FDI flows.	✓	

Note: (+) in VAR and in OIRF indicates a significantly positive relationship between the impulse variable and response variable; (–) in VAR and in OIRF indicates a significantly negative relationship between the impulse variable and response variable; (0) in VAR and in OIRF indicates insignificant relationship between the impulse variable and response variable; (+/–) in VAR and in OIRF indicates ambiguous relationship between the impulse variable and response variable; (+) in FEVD indicates that the direction of relationship between the impulse variable and response variables is reinforced.
Source: Compiled by the authors.

5. Conclusions and Recommendations

5.1. Conclusions

Assuming full employment, we investigated the ability of labor emigration (i.e., deployment and remittances) and FDI flows to be inclusive – increase the income generating capabilities of those left behind, increase employment opportunities, and reinforce production not only in the manufacturing sector (i.e., representative of the capital-intensive sector) but also in the agricultural sector (i.e., representative of the labor-intensive sector). Because of the limited discussion on the causal impact of emigration on those who are left behind, we traced its dynamics by estimating the impacts of labor emigration on the sending-economy particularly on employment and production in the capital- and labor-intensive sectors of the Philippines.

In validating our hypothesis, we posed the question: *Does labor emigration (i.e., deployment and remittances), and FDIs have an impact on wages, employment, and production in the capital- and labor-intensive sectors in the Philippines?* Addressing such provided answers to *how development strategies that rely on labor emigration and FDI can be recalibrated and made sufficient to achieve inclusive growth*. We were guided by our objective of *determining if migration and FDIs have an impact on wages, employment, and production in the Philippine labor-intensive sector versus capital-intensive sector*.

Against this backdrop, we were not able to confirm our hypothesis that: *labor emigration becomes inclusive since it provides employment opportunities for unemployed laborers left behind in the sending-economy*, and *FDI flows may be inclusive in the long-run since it can give opportunities for unemployed laborers left behind in the sending-economy*. Instead, we found that employment opportunities in manufacturing is due to the transfer of labor, not necessarily from the unemployed in the labor-intensive sector. Similarly, the employment effect of deployment in agriculture is negative and insignificant is due to the inability of the unemployed workers to exploit the opportunities due to limited training.

Our analysis began with addressing our first research objective: to gather relevant data – migration flows, FDI flows, wages, employment, and production in the labor- and capital-intensive sectors of the Philippines, and illustrate their respective trends. From the data, we were able to see that all variables have exhibited an increasing trend only to be disrupted by the COVID-19 pandemic of 2020. It is worth noting that despite the crisis, deployment and remittances has remained resilient as these variables did not exhibit serious declines. FDI flows on the other hand has been increasing but posting dips along the way due to various socio-economic and political issues the Philippines has been involved in affecting appetite of foreign investors towards the economy.

Data at the national, capital-intensive sector-specific, and labor-intensive sector-specific levels allowed us to address our second research objective. It facilitated the use of the VAR approach, to estimate the response of wages, employment, and production to impulses emanating from deployment, remittances, and FDI flows. Estimating the VAR(p) model and its accompanying OIRF and FEVD, we have seen results consistent with theory and/or scholarly literature, as well as counterintuitive findings – all of which have been summarized in Tables 12a and 12b. To facilitate comparison of results, Table 13 presents a cross-comparative compilation. We can see that inclusivity is apparent in the capital-intensive sector but not in the labor-intensive sector. We have also seen potentials of inclusivity provided critical constraints in the labor-sending economy are addressed.

Table 14: Cross-Comparative Compilation of Empirical Findings

Impulse	Response	Capital-Intensive	Labor-Intensive	Conclusion	Remarks
Deployment	Wages	Deployment increases wages in the capital-intensive sector	Deployment increases wages in the labor-intensive sector	Inclusive	Labor emigration has economic and financial benefits to those left behind
	Employment	Deployment increases employment in the capital-intensive sector	Deployment decreases employment in the labor-intensive sector	Not inclusive	Labor emigration has economic and financial benefits to those left behind in the capital-intensive sector; laborers in the labor-intensive

					sector can move to capital-intensive sector or in the international labor market assuming barriers to mobility are hurdled.
	Production	Deployment has an ambiguous impact on production in the capital-intensive sector	Deployment weakly increases production in the labor-intensive sector	Not strongly inclusive	Labor emigration will result to an inward shift in the sending-economy's PPF due to reduction, loss, or exhaustion of its scarce human resources.
Remittances	Wages	Remittances decrease wages in the capital-intensive sector	Remittances decrease wages in the labor-intensive sector	Not inclusive	One of the controversies of remittances.
	Employment	Remittances increase employment in the capital-intensive sector	Remittances decrease employment in the labor-intensive sector	Not inclusive	Because of the success of other household members who emigrated, those left behind, particularly the young, also want to work overseas.
	Production	Remittances have an ambiguous impact on production in the capital-intensive sector	Remittances decrease production in the labor-intensive sector	Not inclusive	Labor emigration will result to an inward shift in the sending-economy's PPF due to reduction, loss, or exhaustion of its scarce human resources
FDI flows	Wages	FDI flows increase wages in the capital-intensive sector	FDI flows increase wages in the labor-intensive sector	Inclusive	FDI flows will increase wages because of an increase in labor demand as production is enhanced with more productive inputs.
	Employment	FDI flows increase employment in the capital-intensive sector	FDI flows decreases employment in the labor-intensive sector	Not inclusive	Labor inputs have become more expensive with higher wages. Most FDI flows go to the capital-intensive sector.
	Production	FDI flows increase production in the capital-intensive sector	FDI flows decrease production the labor-intensive sector	Not inclusive	FDI flows are not necessarily beneficial for the labor-intensive sector because of specific circumstances, issues of adverse selection, and excessive leverage.
Production	FDI flows	Production in the capital-intensive sector does not have significant impact on FDI flows	Production in the labor-intensive sector does not have significant impact on FDI flows	-	FDI flows are not automatic consequences of production alone but more of the state of investment landscape in an economy

Source: Compiled by the authors.

From these results, we have the following salient implications:

On deployment:

1. Labor emigration is not beneficial for the labor-intensive sector (i.e., agriculture). It reduces employment and production.
2. Although labor emigration increases employment in the capital-intensive sector (i.e., manufacturing), it does not increase production because of limited capital inputs.

On remittances:

1. Remittances are not also beneficial for agriculture. We have seen an apparent increase in the reservation wage with remittances. This decreases the supply of labor and production of agriculture. Hence, this decreases the demand for labor and the wage rate.

On FDI flows:

1. FDI flows are beneficial for manufacturing but not necessarily for agriculture.

Therefore, empirical results tell us that labor emigration, remittances, and FDI flows are not inclusive because it worsens the situation in agriculture.

5.2. Policy Recommendations

In addressing our third research objective, our empirical findings from VAR, OIRF, and FEVD provide policy implications on how labor emigration and FDI flows can be inclusive.

5.2.1. Complement Labor Emigration with more FDI Flows.

Labor emigration and FDI flows must be leveraged simultaneously. The weak and insignificant impact of deployment and employment on production indicates that the deployment of labor must be accompanied by FDI flows so the production effect of employment can become significant as more labor can now work with more capital in both sectors. While labor emigration has become an economic fixture of the Philippines, much work is required in attracting FDIs. Thus, there is a need to make the Philippines attractive to FDIs that will infuse the required capital for the labor force.

Attracting FDI flows is easier said than done because they are not automatic consequences of changes in production, wages, or employment levels but more of the state of economic landscape. That is, beyond production, the Philippines must enhance its overall investment climate through resilient macroeconomic fundamentals, robust and investment grade sovereign credit ratings, stable political situation, among others. In line with these, the Philippines has been making significant strides in easing restrictions on foreign enterprises in order to attract FDIs. In particular, the Ease of Doing Business Law, Retail Trade Liberalization Act of 2000, Public Services Act of 1936, and the Foreign Investment Act of 1991 have been recently amended in order to address red tape, corruption, and stringent restrictions of foreign investors on ownership and capitalization. These amendments must be complemented by programs to address persistent critical constraints particularly on infrastructure and high power costs.

In terms of infrastructure development, the Philippines continues its heavy infrastructure spending by diversifying funding strategy using public private partnerships (PPP) so the economy benefits sooner from it. Government must also diffuse investment in infrastructure development beyond metropolitan areas so FDIs can also find its way to rural and agricultural areas. With respect to power cost, government and private sector must intensify its pivot towards renewable energy so the Philippines does not continue relying on coal and fossil fuels.

With the Philippines strengthening its position in ASEAN Economic Community (AEC) and ratifying its membership in the Regional Comprehensive Economic Partnership (RCEP), the country is on the right track introducing amendments in its investment policies. However, implementation must be intensified and unnecessary disruptions mitigated.

5.2.2. Invest in People by Prioritizing Education and Upscaling Skills.

In mobilizing unemployed labor in agriculture, human capital must be formed via education and capability enhancement. This will enhance labor productivity and production in their respective sectors, exploit opportunities in other sectors, and harness the effects of FDI flows.

However, because of the private nature of training, and the persistence of poverty in rural areas, those in the agricultural sector may not be able to shoulder the cost of training. Hence, at the onset, government can provide subsidized technical and vocational training programs to targeted groups, such as farmers and fisherfolks. Government can be more aggressive in responding to: (1) quality improvement needs of basic education and (2) persistence of poverty in agricultural sector. While these can be addressed by ensuring that marginalized sectors have access to capability-enhancement programs through government subsidies, if targeted groups from marginalized sectors have inadequate basic education, it will be ineffective because they will have difficulties participating in such programs requiring prior basic technical skills. In the long run, with an enhanced public basic education, individuals from the marginalized sectors can increase their chances of participating in publicly funded or subsidized capability-enhancement programs. This will create a greater impact on promoting inclusivity because upscaling skills can arrest the reduction of output in agriculture, or any other sector.

Education can also address other sources of non-inclusivity such as standard of living differentials, gender gap, and digital divide. Human capital formation stimulates new ways of doing things, innovates existing practices, and levels the playing field for economic agents.

5.2.3. Enhance Assistance Provided to the Agricultural Sector.

Empirical results indicated that agricultural sector has been adversely impacted by labor emigration and FDI flows warranting assistance for the sector. Since agriculture is a labor-intensive sector, aside from capability-enhancement, government can create more non-farm employment opportunities in this sector. Processing agricultural primary products is a specific non-farm employment opportunity that increases the employment and value added of agriculture. This can be anchored on a value-chain approach to agricultural development wherein production growth should not be limited to individual components of the sector. It must encompass agriculture's entire value chain from procurement to production to processing to distribution. Government can also invest on effective irrigation systems; transport infrastructure; programs that promote resilience and disaster risk reduction; innovations to manage diseases and pests; design programs to enhance planning and management of land use and water resources; ensure adequate financing to enhance the competitiveness of agriculture under trade liberalization; and strengthen government financial and technical assistance. However, with limited government funding, private sector participation can be tapped through investment in agribusiness and agritourism where both farmers and private sector mutually benefits. These promote efficiency in performing agricultural work developing the sector's productive capacity resulting to production growth.

5.2.4. Redirect Utilization of Remittances from Consumption to Savings-Investment.

To mitigate the consequential increase in reservation wage due to remittances, redirecting the use of remittances from consumption to savings-investment alternatives may be worthwhile. That is, a lower proportion of remittances allocated for consumption may encourage its recipients to increase labor supply. This will mitigate employment and production decline.

By strengthening and innovating social security, government-backed investment schemes (e.g., provident funds – Flexi-Fund program) and housing programs (e.g., home development mutual funds), remittances can be mobilized towards productive use through savings-investment. These vehicles serve as channels for migrant workers to place their money in interest-earning instruments. Savings mobilization would motivate them to save while they work abroad and would maximize gains from remittances. Such will sustainably create value and augment household income resulting to faster capital accumulation.

With the right value proposition, venturing into remittance-fueled entrepreneurship can increase income, provide employment, and alleviate poverty. Through Go Negosyo's caravans, business seminars, multimedia campaigns, and publications, it can encourage Filipinos to engage in business. Such programs can also introduce remittance-recipient households to viable business opportunities, entrepreneurship-related training programs, and funding sources that can stimulate the enterprising attitude and competitive nature of Filipinos.

5.2.5. Recommendations for Future Studies.

We have been limited by the availability of consistent and longer time series data for our variables. Specifically, we have encountered short time series data as data providers are not able to consistently compile information (e.g., FDI, wage, and production data) and make them readily accessible. A limited number of years is publicly posted only to be worsened by varying data recording methodologies and missing years not posted. This has been bridged by alternative sources from international organizations and subscription data. We recommend the following to improve data analytics on inclusivity:

1. There should be a fundamental data governance. Government must invest in digital infrastructure and processes needed for the consistent collection, management, and processing of longer time series data.
2. There is a need to eliminate data silos across government agencies (PSA, BSP, POEA, DOLE, NEDA, among others) and support the development of standards and protocols for data collection, management, and processing.
3. There is a need to create initiatives to increase data sharing and access such as the creation of reliable data portals for easy access to labor-relevant dataset.

Because this study is the first to bridge the gap identified in Figure 1 that provides basis to expanding discourse on the inclusivity of factor flows, future studies may shift the research design from a purely quantitative approach to a mixed methods approach by incorporating a qualitative design. This will allow for the inclusion of variables beyond trade liberalization, such as well-being level, gender inequality, access to digitalization, among others, in explaining inclusivity.

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7. Declaration of Ownership

This report is our original work.

8. Ethical Clearance

All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee.

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10. Appendix

Appendix 1: Dataset

Year	DEPLY	REMIT	lnREMIT	FDINV	lnFDINV	PMNFG	WMNFG	EMNFG	PAGRI	WAGRI	EAGRI
1991	721.00	1,649,374.00	14.32	1.05	0.05	63,538,593.58	196.43	2,405,138.77	30,939,001.72	88.06	6,788,024.81
1992	756.00	2,221,788.00	14.61	0.38	(0.97)	63,172,962.09	204.62	2,482,788.83	33,108,593.87	91.73	7,071,655.80
1993	941.00	2,276,395.00	14.64	2.00	0.69	65,793,045.46	210.95	2,470,973.32	34,271,422.03	95.55	7,292,404.50
1994	939.00	3,008,747.00	14.92	2.17	0.78	69,876,248.54	217.47	2,569,181.91	37,214,626.48	99.53	7,279,777.74
1995	795.00	3,868,578.00	15.17	1.75	0.56	73,611,020.99	224.20	2,657,720.77	39,061,122.59	103.68	7,508,323.54
1996	900.00	4,306,491.00	15.28	1.60	0.47	79,350,325.32	231.13	2,921,752.47	40,079,280.20	108.00	7,325,815.89
1997	1,013.00	5,741,835.00	15.56	1.30	0.26	84,896,996.33	238.28	3,000,014.90	39,160,212.80	111.34	7,250,518.08
1998	904.00	7,367,989.00	15.81	3.07	1.12	83,549,017.51	243.14	3,055,918.42	35,319,904.72	114.79	7,204,967.08
1999	1,016.00	6,021,219.00	15.61	2.14	0.76	84,216,974.80	248.10	3,113,859.41	38,139,959.31	118.34	7,430,500.82
2000	978.00	6,050,450.00	15.62	1.78	0.58	93,716,624.53	253.17	3,110,210.18	37,355,301.83	122.00	7,109,351.91
2001	1,029.00	6,031,271.00	15.61	0.96	(0.04)	98,530,624.87	258.33	3,023,834.78	37,559,417.84	125.77	6,941,525.03
2002	1,056.00	6,886,156.00	15.75	2.10	0.74	103,445,588.64	263.60	3,289,086.99	39,995,447.01	127.04	7,572,308.05
2003	982.00	7,578,458.00	15.84	0.57	(0.57)	110,079,050.53	266.27	3,096,633.15	41,911,412.65	128.32	7,051,311.69
2004	1,180.00	8,550,371.00	15.96	0.62	(0.47)	117,244,530.65	268.96	3,221,364.46	48,770,328.19	129.62	7,213,095.92
2005	1,327.00	10,689,005.00	16.18	1.55	0.44	127,633,778.86	271.67	3,300,862.52	51,023,603.27	130.93	7,302,128.36
2006	1,515.00	12,761,308.00	16.36	2.12	0.75	137,128,001.55	274.42	3,353,688.45	54,753,730.78	132.25	7,330,262.61
2007	1,747.00	14,449,928.00	16.49	1.87	0.63	147,945,499.63	277.19	3,428,877.58	60,999,062.17	132.65	7,352,601.31
2008	2,002.00	16,426,857.00	16.61	0.74	(0.30)	156,210,478.42	289.56	3,474,431.78	69,206,257.37	138.85	7,446,605.24
2009	1,912.00	17,348,052.00	16.67	1.17	0.16	153,439,443.98	299.93	3,516,041.40	70,776,087.74	145.14	7,709,812.53
2010	2,043.00	18,762,989.00	16.75	0.51	(0.67)	170,992,815.43	310.57	3,635,218.20	72,696,024.06	152.01	7,708,875.53
2011	2,158.00	20,116,992.00	16.82	0.86	(0.15)	175,669,299.73	316.49	3,774,759.49	79,013,784.35	158.20	8,014,501.33
2012	2,220.00	21,391,333.00	16.88	1.23	0.21	192,206,032.72	330.03	3,778,565.97	80,163,494.41	166.74	7,956,204.18
2013	2,285.00	22,984,034.81	16.95	1.32	0.27	201,272,651.99	343.97	3,903,922.55	81,576,699.12	170.34	7,782,579.55
2014	2,320.00	24,628,058.47	17.02	1.93	0.66	217,227,170.97	346.74	4,178,636.99	85,860,293.06	185.31	7,977,134.46
2015	2,447.00	25,606,830.18	17.06	1.84	0.61	223,696,064.77	358.71	4,237,604.62	80,699,348.56	194.50	7,640,056.70
2016	2,240.45	26,899,840.26	17.11	2.60	0.95	241,863,637.36	383.65	4,706,243.09	81,498,234.55	209.32	7,272,651.70
2017	2,338.57	28,059,789.50	17.15	3.12	1.14	257,309,362.15	390.53	4,644,014.58	86,972,102.09	220.26	6,465,583.58
2018	2,299.12	28,943,111.94	17.18	2.87	1.05	284,271,207.72	417.16	4,924,978.20	89,755,279.96	237.44	6,275,778.70
2019	2,177.08	30,133,299.90	17.22	2.30	0.83	304,703,504.42	421.33	5,123,657.14	88,618,674.72	260.37	6,126,553.05
2020	1,771.46	29,903,255.70	17.21	1.89	0.63	261,545,917.01	429.76	4,250,168.79	93,800,501.56	270.60	5,752,574.45
2021	1,825.03	31,417,614.42	17.26	2.67	0.98	293,898,892.31	442.65	4,732,808.21	102,434,632.94	285.19	6,147,417.80
Source	PSA (SOF)	BSP	Computed	Macrotrends	Computed	Computed	PSA (LFS)	Computed	Computed	PSA (LFS)	Computed
Unit	in 000 pax	in current 000 USD	ln	in current billion USD	ln	in PPP, 000 current USD	ADBP	in pax	in PPP, 000 current USD	ADBP	in pax

Appendix 2: Standard Time Series Analysis Procedures

Appendix 2.1: Phillips-Perron Stationarity Test

```
. pperron deply

       Phillips-Perron test for unit root                 Number of obs   =
       30
                                                          Newey-West lags =
       3

                                ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -1.937           -17.540           -12.660           -10.300
 Z(t)             -1.304            -3.716            -2.986            -2.624
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.6274

. pperron D1.deply

Phillips-Perron test for unit root                 Number of obs   =        29
                                                   Newey-West lags =         3

                                ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)          -28.139           -17.472           -12.628           -10.280
 Z(t)             -4.756            -3.723            -2.989            -2.625
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0001

. pperron lnremit

Phillips-Perron test for unit root                 Number of obs   =        30
                                                   Newey-West lags =         3

                                ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
```

```
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -1.835          -17.540           -12.660           -10.300
 Z(t)             -2.942           -3.716            -2.986            -2.624
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0407

. pperron D.lnremit

Phillips-Perron test for unit root                 Number of obs   =        29
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)          -24.284          -17.472           -12.628           -10.280
 Z(t)             -4.523           -3.723            -2.989            -2.625
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0002

. pperron lnfdifl

Phillips-Perron test for unit root                 Number of obs   =        30
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)          -17.964          -17.540           -12.660           -10.300
 Z(t)             -3.452           -3.716            -2.986            -2.624
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0093

. pperron pmnfg

Phillips-Perron test for unit root                 Number of obs   =        30
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)            1.016          -17.540           -12.660           -10.300
 Z(t)              1.658           -3.716            -2.986            -2.624
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9980

. pperron D1.pmnfg

Phillips-Perron test for unit root                 Number of obs   =        29
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)          -38.923          -17.472           -12.628           -10.280
 Z(t)             -7.038           -3.723            -2.989            -2.625
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0000

. pperron wmnfg

Phillips-Perron test for unit root                 Number of obs   =        30
                                                   Newey-West lags =         3
```

```
                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)            1.155           -17.540           -12.660           -10.300
 Z(t)              2.707            -3.716            -2.986            -2.624
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9991

. pperron D1.wmnfg

Phillips-Perron test for unit root                Number of obs   =        29
                                                  Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)          -32.575           -17.472           -12.628           -10.280
 Z(t)             -4.910            -3.723            -2.989            -2.625
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0000

. pperron emnfg

Phillips-Perron test for unit root                Number of obs   =        30
                                                  Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -0.626           -17.540           -12.660           -10.300
 Z(t)             -0.466            -3.716            -2.986            -2.624
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.8985

. pperron D1.emnfg

Phillips-Perron test for unit root                Number of obs   =        29
                                                  Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)          -42.619           -17.472           -12.628           -10.280
 Z(t)             -8.041            -3.723            -2.989            -2.625
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0000

. pperron pagri

Phillips-Perron test for unit root                Number of obs   =        30
                                                  Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)            0.680           -17.540           -12.660           -10.300
 Z(t)              0.756            -3.716            -2.986            -2.624
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9909

. pperron D1.pagri

Phillips-Perron test for unit root                Number of obs   =        29
```

```
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)          -24.706           -17.472           -12.628           -10.280
 Z(t)             -4.100            -3.723            -2.989            -2.625
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0010

. pperron wagri

Phillips-Perron test for unit root                 Number of obs   =        30
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)            2.645           -17.540           -12.660           -10.300
 Z(t)              5.824            -3.716            -2.986            -2.624
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 1.0000

. pperron D1.wagri

Phillips-Perron test for unit root                 Number of obs   =        29
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -6.674           -17.472           -12.628           -10.280
 Z(t)             -1.770            -3.723            -2.989            -2.625
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.3955

. pperron D2.wagri

Phillips-Perron test for unit root                 Number of obs   =        28
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)          -42.224           -17.404           -12.596           -10.260
 Z(t)            -11.435            -3.730            -2.992            -2.626
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0000

. pperron eagri

Phillips-Perron test for unit root                 Number of obs   =        30
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -4.939           -17.540           -12.660           -10.300
 Z(t)             -1.334            -3.716            -2.986            -2.624
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.6132

. pperron D1.eagri
```

```
Phillips-Perron test for unit root                 Number of obs   =        29
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)          -33.956           -17.472           -12.628           -10.280
 Z(t)             -5.377            -3.723            -2.989            -2.625
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0000
```

Appendix 2.2: Engle-Granger Cointegration Test

```
. egranger D1.deply D1.wmnfg D1.emnfg D1.pmnfg

Engle-Granger test for cointegration                  N (1st step)  =       30
                                                      N (test)      =       29
------------------------------------------------------------------------------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -5.186            -5.313            -4.497            -4.105

Critical values from MacKinnon (1990, 2010)

. egranger D1.lnremit D1.wmnfg D1.emnfg D1.pmnfg
Replacing variable _egresid...

Engle-Granger test for cointegration                  N (1st step)  =       30
                                                      N (test)      =       29
------------------------------------------------------------------------------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -5.315            -5.313            -4.497            -4.105

Critical values from MacKinnon (1990, 2010)

. egranger D1.lnfdinv D1.wmnfg D1.emnfg D1.pmnfg
Replacing variable _egresid...

Engle-Granger test for cointegration                  N (1st step)  =       30
                                                      N (test)      =       29
------------------------------------------------------------------------------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -7.755            -5.313            -4.497            -4.105

Critical values from MacKinnon (1990, 2010)

. egranger D1.deply D1.wagri D1.eagri D1.pagri
Replacing variable _egresid...

Engle-Granger test for cointegration                  N (1st step)  =       30
                                                      N (test)      =       29
------------------------------------------------------------------------------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -6.138            -5.313            -4.497            -4.105
```

```
Critical values from MacKinnon (1990, 2010)

. egranger D1.lnremit D1.wagri D1.eagri D1.pagri
Replacing variable _egresid...

Engle-Granger test for cointegration                  N (1st step)  =       30
                                                      N (test)      =       29
------------------------------------------------------------------------------
               Test         1% Critical       5% Critical      10% Critical
            Statistic          Value             Value             Value
------------------------------------------------------------------------------
 Z(t)           -5.124           -5.313            -4.497            -4.105

Critical values from MacKinnon (1990, 2010)

. egranger D1.lnfdinv D1.wagri D1.eagri D1.pagri
Replacing variable _egresid...

Engle-Granger test for cointegration                  N (1st step)  =       30
                                                      N (test)      =       29
------------------------------------------------------------------------------
               Test         1% Critical       5% Critical      10% Critical
            Statistic          Value             Value             Value
------------------------------------------------------------------------------
 Z(t)           -7.685           -5.313            -4.497            -4.105

Critical values from MacKinnon (1990, 2010)

. egranger D1.lnfdinv D1.pmnfg
Replacing variable _egresid...

Engle-Granger test for cointegration                  N (1st step)  =       30
                                                      N (test)      =       29
------------------------------------------------------------------------------
               Test         1% Critical       5% Critical      10% Critical
            Statistic          Value             Value             Value
------------------------------------------------------------------------------
 Z(t)           -8.272           -4.301            -3.555            -3.194

Critical values from MacKinnon (1990, 2010)

. egranger D1.lnfdinv D1.pagri
Replacing variable _egresid...

Engle-Granger test for cointegration                  N (1st step)  =       30
                                                      N (test)      =       29
------------------------------------------------------------------------------
               Test         1% Critical       5% Critical      10% Critical
            Statistic          Value             Value             Value
------------------------------------------------------------------------------
 Z(t)           -8.302           -4.301            -3.555            -3.194

Critical values from MacKinnon (1990, 2010)
```

Appendix 2.3: Optimal Lag Order Selection

```
. varsoc D1.deply D1.wmnfg D1.emnfg D1.pmnfg

   Selection-order criteria
   Sample:  1996 - 2021                         Number of obs      =        26
  +---------------------------------------------------------------------------+
  |lag |    LL      LR      df    p      FPE       AIC      HQIC      SBIC    |
  |----+----------------------------------------------------------------------|
  |  0 | -1050.05                       1.9e+30   81.081   81.1367*  81.2745* |
  |  1 | -1034.07  31.962   16  0.010  2.0e+30   81.0824   81.3611   82.0502  |
  |  2 | -1015.55  37.045   16  0.002  1.8e+30*  80.8884     81.39   82.6304  |
```

```
  |  3 | -999.347  32.404   16  0.009  2.3e+30   80.8728   81.5974    83.389  |
  |  4 | -975.936  46.822*  16  0.000  2.5e+30   80.3028*  81.2503   83.5932  |
  +---------------------------------------------------------------------------+
   Endogenous:  D.deply D.wmnfg D.emnfg D.pmnfg
    Exogenous:  _cons

. varsoc D1.lnremit D1.wmnfg D1.emnfg D1.pmnfg

   Selection-order criteria
   Sample:  1996 - 2021                         Number of obs      =        26
  +---------------------------------------------------------------------------+
  |lag |    LL      LR      df    p      FPE       AIC      HQIC      SBIC    |
  |----+----------------------------------------------------------------------|
  |  0 | -863.479                      1.1e+24*  66.7291*  66.7849*  66.9227* |
  |  1 | -852.863  21.231   16  0.170  1.7e+24   67.1433    67.422   68.1111  |
  |  2 | -836.329  33.069   16  0.007  1.8e+24   67.1022   67.6038   68.8442  |
  |  3 |  -826.97  18.718   16  0.284  4.0e+24   67.6131   68.3376   70.1293  |
  |  4 | -805.187  43.565*  16  0.000  4.9e+24   67.1683   68.1158   70.4587  |
  +---------------------------------------------------------------------------+
   Endogenous:  D.lnremit D.wmnfg D.emnfg D.pmnfg
    Exogenous:  _cons

. varsoc D1.lnfdinv D1.wmnfg D1.emnfg D1.pmnfg

   Selection-order criteria
   Sample:  1996 - 2021                         Number of obs      =        26
  +---------------------------------------------------------------------------+
  |lag |    LL      LR      df    p      FPE       AIC      HQIC      SBIC    |
  |----+----------------------------------------------------------------------|
  |  0 |  -906.72                      3.1e+25*  70.0554*  70.1111*  70.2489* |
  |  1 |  -894.71  24.019   16  0.089  4.3e+25   70.3623    70.641   71.3301  |
  |  2 | -877.479  34.463   16  0.005  4.4e+25   70.2676   70.7692   72.0096  |
  |  3 | -869.251  16.456   16  0.422  1.0e+26   70.8654     71.59   73.3816  |
  |  4 | -850.462  37.579*  16  0.002  1.6e+26   70.6509   71.5984   73.9413  |
  +---------------------------------------------------------------------------+
   Endogenous:  D.lnfdinv D.wmnfg D.emnfg D.pmnfg
    Exogenous:  _cons

. varsoc D1.deply D1.wagri D1.eagri D1.pagri

   Selection-order criteria
   Sample:  1996 - 2021                         Number of obs      =        26
  +---------------------------------------------------------------------------+
  |lag |    LL      LR      df    p      FPE       AIC      HQIC      SBIC    |
  |----+----------------------------------------------------------------------|
  |  0 | -1034.33                      5.7e+29   79.8717   79.9275   80.0653* |
  |  1 | -1012.46  43.746   16  0.000  3.7e+29     79.42   79.6987   80.3877  |
  |  2 | -994.005  36.909   16  0.002  3.4e+29   79.2312   79.7328   80.9732  |
  |  3 | -972.901  42.208   16  0.000  3.0e+29   78.8386   79.5631   81.3547  |
  |  4 | -944.119  57.565*  16  0.000  2.1e+29*  77.8553*  78.8028*  81.1457  |
  +---------------------------------------------------------------------------+
   Endogenous:  D.deply D.wagri D.eagri D.pagri
    Exogenous:  _cons

. varsoc D1.lnremit D1.wagri D1.eagri D1.pagri

   Selection-order criteria
   Sample:  1996 - 2021                         Number of obs      =        26
  +---------------------------------------------------------------------------+
  |lag |    LL      LR      df    p      FPE       AIC      HQIC      SBIC    |
  |----+----------------------------------------------------------------------|
  |  0 |  -845.72                      2.9e+23   65.3631   65.4188   65.5566* |
  |  1 | -827.407  36.627   16  0.002  2.4e+23   65.1851   65.4638   66.1529  |
  |  2 | -813.634  27.545   16  0.036  3.2e+23   65.3565   65.8581   67.0984  |
  |  3 | -785.681  55.906   16  0.000  1.7e+23*   64.437*  65.1616*  66.9532  |
  |  4 | -772.487  26.387*  16  0.049  3.9e+23   64.6529   65.6004   67.9433  |
  +---------------------------------------------------------------------------+
   Endogenous:  D.lnremit D.wagri D.eagri D.pagri
```

```
    Exogenous:  _cons

. varsoc D1.lnfdinv D1.wagri D1.eagri D1.pagri

   Selection-order criteria
   Sample:  1996 - 2021                         Number of obs      =        26
  +---------------------------------------------------------------------------+
  |lag |    LL      LR      df    p      FPE       AIC      HQIC      SBIC    |
  |----+----------------------------------------------------------------------|
  |  0 | -890.312                      8.8e+24   68.7932    68.849   68.9868* |
  |  1 | -870.736  39.151   16  0.001  6.8e+24   68.5182   68.7969   69.4859  |
  |  2 | -856.266   28.94   16  0.024  8.5e+24   68.6359   69.1375   70.3778  |
  |  3 | -832.082  48.368   16  0.000  6.0e+24*  68.0063*  68.7309*  70.5225  |
  |  4 | -818.891  26.382*  16  0.049  1.4e+25   68.2224   69.1699   71.5128  |
  +---------------------------------------------------------------------------+
   Endogenous:  D.lnfdinv D.wagri D.eagri D.pagri
    Exogenous:  _cons

. varsoc D1.lnfdinv D1.pmnfg

   Selection-order criteria
   Sample:  1996 - 2021                         Number of obs      =        26
  +---------------------------------------------------------------------------+
  |lag |    LL      LR      df    p      FPE       AIC      HQIC      SBIC    |
  |----+----------------------------------------------------------------------|
  |  0 | -483.229                      5.6e+13   37.3253   37.3532*  37.4221* |
  |  1 | -479.109  8.2387    4  0.083  5.5e+13*  37.3161*  37.3997   37.6064  |
  |  2 | -477.863  2.4929    4  0.646  6.9e+13   37.5279   37.6673   38.0118  |
  |  3 | -476.017   3.692    4  0.449  8.3e+13   37.6936   37.8887    38.371  |
  |  4 | -475.455  1.1246    4  0.890  1.1e+14    37.958   38.2089    38.829  |
  +---------------------------------------------------------------------------+
   Endogenous:  D.lnfdinv D.pmnfg
    Exogenous:  _cons

. varsoc D1.lnfdinv D1.pagri

   Selection-order criteria
   Sample:  1996 - 2021                         Number of obs      =        26
  +---------------------------------------------------------------------------+
  |lag |    LL      LR      df    p      FPE       AIC      HQIC      SBIC    |
  |----+----------------------------------------------------------------------|
  |  0 | -447.715                      3.6e+12*  34.5935*  34.6213*  34.6902* |
  |  1 | -445.324  4.7814    4  0.310  4.1e+12   34.7172   34.8008   35.0076  |
  |  2 | -444.408  1.8317    4  0.767  5.2e+12   34.9545   35.0938   35.4384  |
  |  3 | -439.449  9.9179*   4  0.042  5.0e+12   34.8807   35.0758   35.5582  |
  |  4 | -438.292  2.3147    4  0.678  6.4e+12   35.0994   35.3502   35.9704  |
  +---------------------------------------------------------------------------+
   Endogenous:  D.lnfdinv D.pagri
    Exogenous:  _cons
```

Appendix 3: VAR(p) Results for Equation 2

Appendix 3.1: VAR(p) for Capital-Intensive Sector

```
. var D1.deply D1.wmnfg D1.emnfg D1.pmnfg, lags(1/4) lutstats

Vector autoregression

Sample:  1996 - 2021                               No. of obs      =        26
Log likelihood =  -975.936            (lutstats)   AIC             =  68.64357
FPE            =  2.46e+30                         HQIC            =  69.53535
Det(Sigma_ml)  =  4.71e+27                         SBIC            =  71.74042

Equation           Parms      RMSE     R-sq      chi2     P>chi2
----------------------------------------------------------------
D_deply              17     135.902   0.6880   57.32487   0.0000
D_wmnfg              17      5.1823   0.7582   81.51867   0.0000
```

```
D_emnfg             17      177266   0.8154   114.8341   0.0000
D_pmnfg             17     1.2e+07   0.7026   61.42426   0.0000
----------------------------------------------------------------

------------------------------------------------------------------------------
             |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
D_deply      |
       deply |
         LD. |  -.5673889   .2419161    -2.35   0.019    -1.041536    -.093242
        L2D. |   .0716907   .1977355     0.36   0.717    -.3158637    .4592451
        L3D. |   .1526657   .1905212     0.80   0.423     -.220749    .5260803
        L4D. |   .6202917   .2656991     2.33   0.020     .0995311    1.141052
             |
       wmnfg |
         LD. |  -12.19063   5.186552    -2.35   0.019    -22.35609   -2.025174
        L2D. |   -4.55928   6.773131    -0.67   0.501    -17.83437    8.715812
        L3D. |  -9.962252   6.012334    -1.66   0.098    -21.74621    1.821706
        L4D. |  -10.03403   6.414649    -1.56   0.118    -22.60651    2.538449
             |
       emnfg |
         LD. |   -.000197   .0001913    -1.03   0.303    -.0005719     .000178
        L2D. |   .0001305   .0002022     0.65   0.519    -.0002658    .0005267
        L3D. |    .000342   .0002487     1.38   0.169    -.0001453    .0008294
        L4D. |  -.0002917   .0002103    -1.39   0.165    -.0007039    .0001205
             |
       pmnfg |
         LD. |   8.14e-06   3.57e-06     2.28   0.023     1.15e-06    .0000151
        L2D. |   8.51e-07   5.05e-06     0.17   0.866    -9.05e-06    .0000108
        L3D. |   2.39e-06   3.76e-06     0.64   0.525    -4.97e-06    9.75e-06
        L4D. |  -4.66e-06   5.08e-06    -0.92   0.358    -.0000146    5.28e-06
             |
       _cons |   238.5109   56.37562     4.23   0.000     128.0167    349.0051
-------------+----------------------------------------------------------------
D_wmnfg      |
       deply |
         LD. |   .0057214   .0092249     0.62   0.535    -.0123591    .0238019
        L2D. |  -.0032072   .0075402    -0.43   0.671    -.0179857    .0115713
        L3D. |   .0223525   .0072651     3.08   0.002     .0081132    .0365918
        L4D. |   .0301669   .0101318     2.98   0.003      .010309    .0500249
             |
       wmnfg |
         LD. |  -.0879403    .197777    -0.44   0.657     -.475576    .2996954
        L2D. |   -.184141   .2582774    -0.71   0.476    -.6903554    .3220735
        L3D. |    .041795   .2292662     0.18   0.855    -.4075585    .4911486
        L4D. |   .1821397   .2446075     0.74   0.457    -.2972822    .6615617
             |
       emnfg |
         LD. |   4.09e-07   7.29e-06     0.06   0.955    -.0000139    .0000147
        L2D. |   .0000442   7.71e-06     5.73   0.000      .000029    .0000593
        L3D. |   .0000182   9.48e-06     1.92   0.055    -4.18e-07    .0000368
        L4D. |   4.93e-06   8.02e-06     0.61   0.539    -.0000108    .0000206
             |
       pmnfg |
         LD. |   2.09e-08   1.36e-07     0.15   0.878    -2.46e-07    2.88e-07
        L2D. |   4.18e-07   1.93e-07     2.17   0.030     4.02e-08    7.96e-07
        L3D. |   3.73e-08   1.43e-07     0.26   0.795    -2.43e-07    3.18e-07
        L4D. |  -4.70e-07   1.94e-07    -2.43   0.015    -8.50e-07   -9.09e-08
             |
       _cons |  -1.794803   2.149752    -0.83   0.404    -6.008239    2.418633
-------------+----------------------------------------------------------------
D_emnfg      |
       deply |
         LD. |  -194.1467   315.5465    -0.62   0.538    -812.6064     424.313
        L2D. |  -242.7147   257.9188    -0.94   0.347    -748.2263    262.7969
        L3D. |   600.2947   248.5088     2.42   0.016     113.2264    1087.363
        L4D. |  -89.11343    346.568    -0.26   0.797    -768.3743    590.1475
             |
```

```
       wmnfg |
         LD. |   20761.71   6765.147     3.07   0.002     7502.264    34021.15
        L2D. |   -20341.4   8834.622    -2.30   0.021    -37656.94   -3025.862
        L3D. |   21031.93   7842.266     2.68   0.007     5661.373    36402.49
        L4D. |  -29571.94   8367.031    -3.53   0.000    -45971.01   -13172.86
             |
       emnfg |
         LD. |   .2010146   .2495256     0.81   0.420    -.2880465    .6900757
        L2D. |   .5086543   .2637117     1.93   0.054    -.0082112     1.02552
        L3D. |  -.1372902   .3243345    -0.42   0.672    -.7729742    .4983938
        L4D. |  -.1355219   .2743387    -0.49   0.621    -.6732159    .4021722
             |
       pmnfg |
         LD. |  -.0039307   .0046563    -0.84   0.399    -.0130569    .0051956
        L2D. |    .011273   .0065912     1.71   0.087    -.0016455    .0241914
        L3D. |  -.0166024   .0048991    -3.39   0.001    -.0262045   -.0070003
        L4D. |  -.0015093   .0066202    -0.23   0.820    -.0144847     .011466
             |
       _cons |   148890.1   73534.27     2.02   0.043     4765.583    293014.6
-------------+----------------------------------------------------------------
D_pmnfg      |
       deply |
         LD. |  -16291.56   21532.28    -0.76   0.449    -58494.06    25910.93
        L2D. |  -12635.57   17599.88    -0.72   0.473    -47130.71    21859.57
        L3D. |  -5259.896   16957.76    -0.31   0.756    -38496.49     27976.7
        L4D. |   31455.32   23649.13     1.33   0.183    -14896.12    77806.77
             |
       wmnfg |
         LD. |   798701.8   461640.5     1.73   0.084    -106097.1     1703501
        L2D. |    -392374   602857.5    -0.65   0.515     -1573953      789205
        L3D. |   224648.3   535141.1     0.42   0.675      -824209     1273506
        L4D. |   -1577070     570950    -2.76   0.006     -2696111   -458028.3
             |
       emnfg |
         LD. |   2.466085   17.02714     0.14   0.885     -30.9065    35.83867
        L2D. |   22.73925   17.99518     1.26   0.206    -12.53066    58.00915
        L3D. |   11.18948   22.13196     0.51   0.613    -32.18837    54.56733
        L4D. |  -13.20162   18.72034    -0.71   0.481    -49.89282    23.48958
             |
       pmnfg |
         LD. |  -.0790443   .3177393    -0.25   0.804    -.7018019    .5437133
        L2D. |   .5644606   .4497682     1.26   0.209    -.3170689     1.44599
        L3D. |   -.312044   .3343065    -0.93   0.351    -.9672727    .3431847
        L4D. |  -.1525213   .4517503    -0.34   0.736    -1.037936     .732893
             |
       _cons |   1.13e+07    5017837     2.26   0.024      1498435    2.12e+07
------------------------------------------------------------------------------
```

Appendix 3.2: VAR(p) for Labor-Intensive Sector

```
. var D1.deply D1.wagri D1.eagri D1.pagri, lags(1/4) lutstats

Vector autoregression

Sample:  1996 - 2021                               No. of obs      =        26
Log likelihood = -944.1188            (lutstats)  AIC             =  66.19609
FPE            =  2.13e+29                         HQIC            =  67.08787
Det(Sigma_ml)  =  4.08e+26                         SBIC            =  69.29294

Equation           Parms      RMSE     R-sq      chi2     P>chi2
----------------------------------------------------------------
D_deply              17     108.575   0.8008   104.5458   0.0000
D_wagri              17     1.77194   0.9671   764.4382   0.0000
D_eagri              17      345011   0.5448   31.12218   0.0130
D_pagri              17     2.8e+06   0.7551    80.1546   0.0000
----------------------------------------------------------------
```

	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
D_deply						
deply						
LD.	-.3522475	.1579439	-2.23	0.026	-.6618119	-.0426831
L2D.	-.1830042	.1739783	-1.05	0.293	-.5239954	.1579869
L3D.	.1806983	.1812635	1.00	0.319	-.1745715	.5359681
L4D.	.0039929	.1917471	0.02	0.983	-.3718244	.3798103
wagri						
LD.	-15.7817	5.978411	-2.64	0.008	-27.49917	-4.064232
L2D.	-22.19663	9.00839	-2.46	0.014	-39.85275	-4.540508
L3D.	19.89852	10.40612	1.91	0.056	-.4971055	40.29414
L4D.	-8.36883	11.81717	-0.71	0.479	-31.53005	14.79239
eagri						
LD.	-.0001901	.0000693	-2.74	0.006	-.000326	-.0000542
L2D.	-.0000799	.0000807	-0.99	0.322	-.0002381	.0000783
L3D.	.0000312	.0000655	0.48	0.634	-.0000972	.0001596
L4D.	-9.25e-06	.0000786	-0.12	0.906	-.0001633	.0001448
pagri						
LD.	7.80e-07	8.69e-06	0.09	0.929	-.0000163	.0000178
L2D.	.0000167	8.42e-06	1.98	0.047	2.08e-07	.0000332
L3D.	3.17e-06	7.72e-06	0.41	0.681	-.000012	.0000183
L4D.	.000021	8.34e-06	2.52	0.012	4.70e-06	.0000374
_cons	121.4181	46.60444	2.61	0.009	30.07509	212.7611
D_wagri						
deply						
LD.	.006036	.0025776	2.34	0.019	.000984	.0110881
L2D.	.0162806	.0028393	5.73	0.000	.0107156	.0218455
L3D.	.0180444	.0029582	6.10	0.000	.0122465	.0238424
L4D.	.0344439	.0031293	11.01	0.000	.0283106	.0405771
wagri						
LD.	-.3483496	.097567	-3.57	0.000	-.5395773	-.1571218
L2D.	-.1915099	.1470159	-1.30	0.193	-.4796558	.0966359
L3D.	.8745961	.1698267	5.15	0.000	.541742	1.20745
L4D.	1.237102	.1928548	6.41	0.000	.8591133	1.61509
eagri						
LD.	-4.02e-06	1.13e-06	-3.55	0.000	-6.24e-06	-1.80e-06
L2D.	-7.20e-06	1.32e-06	-5.46	0.000	-9.78e-06	-4.62e-06
L3D.	-1.68e-06	1.07e-06	-1.57	0.116	-3.78e-06	4.14e-07
L4D.	-1.84e-06	1.28e-06	-1.43	0.152	-4.35e-06	6.76e-07
pagri						
LD.	-6.62e-07	1.42e-07	-4.67	0.000	-9.40e-07	-3.84e-07
L2D.	3.41e-07	1.37e-07	2.48	0.013	7.19e-08	6.10e-07
L3D.	6.33e-08	1.26e-07	0.50	0.615	-1.84e-07	3.10e-07
L4D.	-1.55e-07	1.36e-07	-1.14	0.255	-4.22e-07	1.12e-07
_cons	-4.594934	.760579	-6.04	0.000	-6.085642	-3.104227
D_eagri						
deply						
LD.	-364.7007	501.8856	-0.73	0.467	-1348.378	618.977
L2D.	-756.4681	552.8366	-1.37	0.171	-1840.008	327.0717
L3D.	101.3016	575.9861	0.18	0.860	-1027.611	1230.214
L4D.	-314.1808	609.2991	-0.52	0.606	-1508.385	880.0235
wagri						
LD.	-46112.75	18997.11	-2.43	0.015	-83346.4	-8879.096
L2D.	-11342.33	28625.23	-0.40	0.692	-67446.75	44762.09
L3D.	11713.02	33066.68	0.35	0.723	-53096.49	76522.53

```
         L4D. |   1787.697   37550.45     0.05   0.962    -71809.84    75385.23
              |
        eagri |
          LD. |  -.3848479    .220284    -1.75   0.081    -.8165967    .0469008
         L2D. |  -.3146273   .2564697    -1.23   0.220    -.8172986     .188044
         L3D. |  -.0720986   .2082053    -0.35   0.729    -.4801735    .3359764
         L4D. |  -.0948602   .2497487    -0.38   0.704    -.5843586    .3946383
              |
        pagri |
          LD. |   .0106711   .0276104     0.39   0.699    -.0434443    .0647865
         L2D. |   .0472978    .026754     1.77   0.077     -.005139    .0997346
         L3D. |   .0454401   .0245405     1.85   0.064    -.0026583    .0935385
         L4D. |   .0133071    .026496     0.50   0.616    -.0386241    .0652382
              |
        _cons |   19539.43   148091.1     0.13   0.895    -270713.9    309792.7
-------------+----------------------------------------------------------------
D_pagri       |
        deply |
          LD. |  -1643.688   4073.797    -0.40   0.687    -9628.184    6340.809
         L2D. |   6518.241   4487.366     1.45   0.146    -2276.834    15313.32
         L3D. |   8267.243    4675.27     1.77   0.077    -896.1178     17430.6
         L4D. |  -5062.507   4945.671    -1.02   0.306    -14755.84    4630.829
              |
        wagri |
          LD. |  -474633.2   154199.2    -3.08   0.002    -776858.1   -172408.3
         L2D. |   304119.5   232350.5     1.31   0.191    -151279.2    759518.2
         L3D. |   183773.8   268401.7     0.68   0.494    -342283.9    709831.6
         L4D. |  -174011.4   304796.4    -0.57   0.568    -771401.4    423378.6
              |
        eagri |
          LD. |  -3.854312   1.788042    -2.16   0.031     -7.35881   -.3498151
         L2D. |   .5697102    2.08176     0.27   0.784    -3.510464    4.649885
         L3D. |  -5.123534   1.689999    -3.03   0.002    -8.435872   -1.811197
         L4D. |  -.6471807   2.027206    -0.32   0.750    -4.620431     3.32607
              |
        pagri |
          LD. |   .4765296   .2241132     2.13   0.033     .0372758    .9157835
         L2D. |  -.2113215   .2171616    -0.97   0.331    -.6369505    .2143074
         L3D. |    .455857   .1991945     2.29   0.022     .0654429    .8462711
         L4D. |  -.0308886   .2150675    -0.14   0.886    -.4524132     .390636
              |
        _cons |    1166650    1202053     0.97   0.332     -1189331     3522632
------------------------------------------------------------------------------
```

Appendix 4:VAR(p) Results for Equation 3

Appendix 4.1: VAR(p) for Capital-Intensive Sector

```
. var D1.lnremit D1.wmnfg D1.emnfg D1.pmnfg, lags(1/4) lutstats

Vector autoregression

Sample:  1996 - 2021                              No. of obs      =        26
Log likelihood = -805.1873           (lutstats)   AIC             =  55.50905
FPE            =  4.85e+24                        HQIC            =  56.40083
Det(Sigma_ml)  =  9.32e+21                        SBIC            =   58.6059

Equation           Parms      RMSE     R-sq      chi2     P>chi2
----------------------------------------------------------------
D_lnremit            17     .117587   0.4305   19.65201   0.2363
D_wmnfg              17     6.25612   0.6476   47.77677   0.0001
D_emnfg              17      176480   0.8170   116.0901   0.0000
D_pmnfg              17     1.1e+07   0.7518   78.76545   0.0000
----------------------------------------------------------------

------------------------------------------------------------------------------
             |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
```

```
-------------+----------------------------------------------------------------
D_lnremit    |
     lnremit |
         LD. |   .0908241   .1829306     0.50   0.620    -.2677133    .4493615
        L2D. |   .0484416   .1642067     0.30   0.768    -.2733977    .3702808
        L3D. |   .3944413   .1925767     2.05   0.041     .0169979    .7718846
        L4D. |  -.2770127   .1786505    -1.55   0.121    -.6271613    .0731359
             |
       wmnfg |
         LD. |   .0069103   .0041968     1.65   0.100    -.0013153    .0151358
        L2D. |   .0008581   .0041294     0.21   0.835    -.0072354    .0089516
        L3D. |  -.0001756   .0035811    -0.05   0.961    -.0071945    .0068432
        L4D. |   -.002803   .0041775    -0.67   0.502    -.0109908    .0053847
             |
       emnfg |
         LD. |  -1.23e-07   1.73e-07    -0.71   0.475    -4.62e-07    2.15e-07
        L2D. |  -9.49e-08   1.82e-07    -0.52   0.601    -4.51e-07    2.61e-07
        L3D. |  -4.63e-07   2.08e-07    -2.22   0.026    -8.71e-07   -5.43e-08
        L4D. |  -2.79e-07   1.94e-07    -1.44   0.150    -6.58e-07    1.01e-07
             |
       pmnfg |
         LD. |   1.07e-09   2.26e-09     0.47   0.636    -3.36e-09    5.51e-09
        L2D. |   6.69e-09   3.78e-09     1.77   0.077    -7.26e-10    1.41e-08
        L3D. |  -3.28e-09   3.26e-09    -1.01   0.314    -9.66e-09    3.10e-09
        L4D. |  -7.24e-09   4.18e-09    -1.73   0.083    -1.54e-08    9.43e-10
             |
       _cons |   .1153577   .0575856     2.00   0.045      .002492    .2282233
-------------+----------------------------------------------------------------
D_wmnfg      |
     lnremit |
         LD. |    -23.137   9.732692    -2.38   0.017    -42.21273   -4.061278
        L2D. |  -7.095086   8.736501    -0.81   0.417    -24.21831    10.02814
        L3D. |  -.9709981    10.2459    -0.09   0.924     -21.0526    19.11061
        L4D. |    6.90908   9.504974     0.73   0.467    -11.72033    25.53849
             |
       wmnfg |
         LD. |  -.0505809    .223287    -0.23   0.821    -.4882154    .3870535
        L2D. |  -.1659971   .2197017    -0.76   0.450    -.5966046    .2646103
        L3D. |   .1572528     .19053     0.83   0.409    -.2161791    .5306847
        L4D. |  -.5298633   .2222605    -2.38   0.017    -.9654859   -.0942407
             |
       emnfg |
         LD. |   .0000199   9.19e-06     2.16   0.031     1.86e-06    .0000379
        L2D. |   .0000414   9.66e-06     4.28   0.000     .0000224    .0000603
        L3D. |   3.09e-06   .0000111     0.28   0.780    -.0000186    .0000248
        L4D. |  -6.59e-06   .0000103    -0.64   0.522    -.0000268    .0000136
             |
       pmnfg |
         LD. |  -1.32e-07   1.20e-07    -1.10   0.272    -3.68e-07    1.04e-07
        L2D. |   4.18e-07   2.01e-07     2.08   0.038     2.38e-08    8.12e-07
        L3D. |   1.00e-07   1.73e-07     0.58   0.564    -2.39e-07    4.39e-07
        L4D. |  -6.84e-08   2.22e-07    -0.31   0.758    -5.04e-07    3.67e-07
             |
       _cons |   6.479677     3.0638     2.11   0.034     .4747391    12.48462
-------------+----------------------------------------------------------------
D_emnfg      |
     lnremit |
         LD. |  -210438.2   274551.9    -0.77   0.443      -748550    327673.7
        L2D. |   345478.6   246450.1     1.40   0.161    -137554.7    828511.9
        L3D. |  -703562.9   289029.2    -2.43   0.015     -1270050   -137076.1
        L4D. |   229433.8   268128.1     0.86   0.392    -296087.7    754955.3
             |
       wmnfg |
         LD. |   14386.62   6298.757     2.28   0.022     2041.285    26731.96
        L2D. |  -13015.62   6197.619    -2.10   0.036    -25162.73   -868.5053
        L3D. |   15874.52   5374.707     2.95   0.003     5340.291    26408.75
        L4D. |  -26670.89   6269.801    -4.25   0.000    -38959.47    -14382.3
             |
```

```
      emnfg |
         LD. |   .1657463   .2592862     0.64   0.523    -.3424453    .6739379
        L2D. |   .5362444   .2724946     1.97   0.049     .0021648    1.070324
        L3D. |   .0662097   .3128256     0.21   0.832    -.5469173    .6793367
        L4D. |  -.2963248   .2904581    -1.02   0.308    -.8656123    .2729626
             |
      pmnfg |
         LD. |  -.0039427   .0033964    -1.16   0.246    -.0105995     .002714
        L2D. |  -.0003301   .0056755    -0.06   0.954    -.0114539    .0107937
        L3D. |  -.0102206   .0048856    -2.09   0.036    -.0197961    -.000645
        L4D. |   .0073448   .0062665     1.17   0.241    -.0049373    .0196268
             |
       _cons |   183969.3   86427.49     2.13   0.033     14574.49      353364
-------------+----------------------------------------------------------------
D_pmnfg      |
     lnremit |
         LD. |  -2.29e+07   1.72e+07    -1.33   0.183    -5.66e+07    1.08e+07
        L2D. |   -5555346   1.54e+07    -0.36   0.719    -3.58e+07    2.47e+07
        L3D. |  -1.28e+07   1.81e+07    -0.70   0.481    -4.82e+07    2.27e+07
        L4D. |  -2.73e+07   1.68e+07    -1.63   0.104    -6.02e+07     5597024
             |
       wmnfg |
         LD. |    1066211   394381.4     2.70   0.007     293237.2     1839184
        L2D. |  -344801.4   388048.9    -0.89   0.374     -1105363    415760.5
        L3D. |   535701.4   336524.3     1.59   0.111      -123874     1195277
        L4D. |   -1853515   392568.5    -4.72   0.000     -2622935    -1084095
             |
       emnfg |
         LD. |   17.11891   16.23458     1.05   0.292    -14.70028     48.9381
        L2D. |   31.23139   17.06159     1.83   0.067    -2.208709     64.6715
        L3D. |   12.17174   19.58682     0.62   0.534    -26.21773     50.5612
        L4D. |   -6.23201   18.18633    -0.34   0.732    -41.87657    29.41255
             |
       pmnfg |
         LD. |  -.4772565   .2126543    -2.24   0.025    -.8940512   -.0604617
        L2D. |   .3174088   .3553577     0.89   0.372    -.3790795    1.013897
        L3D. |   -.652477   .3058983    -2.13   0.033    -1.252027   -.0529274
        L4D. |  -.0711387   .3923602    -0.18   0.856    -.8401506    .6978731
             |
       _cons |   2.06e+07    5411448     3.81   0.000      9988100    3.12e+07
------------------------------------------------------------------------------
```

Appendix 4.2: VAR(p) for Labor-Intensive Sector

```
. var D1.lnremit D1.wagri D1.eagri D1.pagri, lags(1/4) lutstats

Vector autoregression

Sample:  1996 - 2021                               No. of obs      =        26
Log likelihood = -772.4874            (lutstats)   AIC             =  52.99368
FPE            =  3.92e+23                         HQIC            =  53.88546
Det(Sigma_ml)  =  7.53e+20                         SBIC            =  56.09053

Equation           Parms      RMSE     R-sq      chi2     P>chi2
----------------------------------------------------------------
D_lnremit            17     .113135   0.4728   23.31555   0.1056
D_wagri              17     4.11526   0.8226   120.5448   0.0000
D_eagri              17      255094   0.7512   78.48916   0.0000
D_pagri              17     3.0e+06   0.7148   65.16059   0.0000
----------------------------------------------------------------

------------------------------------------------------------------------------
             |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
D_lnremit    |
     lnremit |
         LD. |   .3884934   .2282366     1.70   0.089    -.0588421    .8358289
```

L2D.	-.0751885	.1629312	-0.46	0.644	-.3945278	.2441507
L3D.	.1946313	.1552518	1.25	0.210	-.1096567	.4989193
L4D.	-.2614719	.1531237	-1.71	0.088	-.5615888	.038645
wagri						
LD.	.0005464	.0065062	0.08	0.933	-.0122055	.0132984
L2D.	.0120365	.0089013	1.35	0.176	-.0054097	.0294827
L3D.	-.0081211	.008392	-0.97	0.333	-.0245691	.008327
L4D.	-.0047548	.0102197	-0.47	0.642	-.0247851	.0152755
eagri						
LD.	-2.10e-08	7.28e-08	-0.29	0.773	-1.64e-07	1.22e-07
L2D.	7.78e-08	9.19e-08	0.85	0.397	-1.02e-07	2.58e-07
L3D.	1.12e-07	6.81e-08	1.65	0.100	-2.14e-08	2.46e-07
L4D.	1.04e-07	7.59e-08	1.37	0.169	-4.45e-08	2.53e-07
pagri						
LD.	1.72e-08	9.09e-09	1.89	0.059	-6.58e-10	3.50e-08
L2D.	-4.26e-09	8.43e-09	-0.51	0.613	-2.08e-08	1.23e-08
L3D.	5.40e-09	7.62e-09	0.71	0.478	-9.53e-09	2.03e-08
L4D.	-1.96e-08	1.03e-08	-1.90	0.058	-3.98e-08	6.28e-10
_cons	.06164	.0571405	1.08	0.281	-.0503533	.1736334
D_wagri						
lnremit						
LD.	-20.95441	8.302072	-2.52	0.012	-37.22617	-4.682648
L2D.	8.388174	5.926597	1.42	0.157	-3.227743	20.00409
L3D.	1.63424	5.647263	0.29	0.772	-9.434191	12.70267
L4D.	-4.384451	5.569851	-0.79	0.431	-15.30116	6.532256
wagri						
LD.	-.1163817	.2366629	-0.49	0.623	-.5802324	.3474691
L2D.	.1079147	.3237832	0.33	0.739	-.5266887	.7425182
L3D.	.6447635	.3052582	2.11	0.035	.0464685	1.243059
L4D.	-.014878	.3717413	-0.04	0.968	-.7434776	.7137216
eagri						
LD.	-7.06e-06	2.65e-06	-2.67	0.008	-.0000122	-1.87e-06
L2D.	-.0000113	3.34e-06	-3.39	0.001	-.0000179	-4.79e-06
L3D.	1.93e-06	2.48e-06	0.78	0.436	-2.93e-06	6.79e-06
L4D.	9.70e-07	2.76e-06	0.35	0.726	-4.44e-06	6.38e-06
pagri						
LD.	-5.22e-07	3.31e-07	-1.58	0.114	-1.17e-06	1.26e-07
L2D.	1.08e-06	3.06e-07	3.52	0.000	4.78e-07	1.68e-06
L3D.	-2.48e-08	2.77e-07	-0.09	0.929	-5.68e-07	5.18e-07
L4D.	6.93e-07	3.75e-07	1.85	0.065	-4.28e-08	1.43e-06
_cons	1.444445	2.078478	0.69	0.487	-2.629297	5.518187
D_eagri						
lnremit						
LD.	-974920.1	514623.1	-1.89	0.058	-1983563	33722.72
L2D.	-59779.81	367373.8	-0.16	0.871	-779819.3	660259.7
L3D.	-849121.2	350058.6	-2.43	0.015	-1535224	-163018.9
L4D.	1500874	345260.1	4.35	0.000	824176.7	2177571
wagri						
LD.	-71263.61	14670.1	-4.86	0.000	-100016.5	-42510.74
L2D.	-27882.58	20070.45	-1.39	0.165	-67219.94	11454.79
L3D.	33653.44	18922.13	1.78	0.075	-3433.258	70740.15
L4D.	47475.92	23043.25	2.06	0.039	2311.985	92639.85
eagri						
LD.	-.2530296	.1640618	-1.54	0.123	-.5745848	.0685255
L2D.	-.2462759	.2071187	-1.19	0.234	-.6522211	.1596694
L3D.	-.2951443	.1535484	-1.92	0.055	-.5960935	.005805

```
         L4D. |    -.13144   .1711922    -0.77   0.443    -.4669706    .2040906
              |
        pagri |
          LD. |   .0092648   .0205019     0.45   0.651    -.0309182    .0494477
         L2D. |    .035197   .0189986     1.85   0.064    -.0020396    .0724336
         L3D. |   .0661352   .0171794     3.85   0.000     .0324642    .0998061
         L4D. |    .017799   .0232643     0.77   0.444    -.0277982    .0633962
              |
        _cons |  -137086.3   128839.3    -1.06   0.287    -389606.6    115434.1
-------------+----------------------------------------------------------------
D_pagri       |
     lnremit |
          LD. |    2618805    6096534     0.43   0.668     -9330182    1.46e+07
         L2D. |   -1350566    4352131    -0.31   0.756     -9880586     7179453
         L3D. |   -8434784    4147004    -2.03   0.042    -1.66e+07   -306804.1
         L4D. |   -2066286    4090158    -0.51   0.613    -1.01e+07     5950276
              |
        wagri |
          LD. |  -296286.4   173790.8    -1.70   0.088    -636910.1    44337.23
         L2D. |   204924.9   237766.6     0.86   0.389    -261089.1    670938.9
         L3D. |  -59844.68   224162.9    -0.27   0.789      -499196    379506.6
         L4D. |  -286463.9   272984.1    -1.05   0.294    -821502.9    248575.1
              |
        eagri |
          LD. |  -5.102439   1.943574    -2.63   0.009    -8.911774   -1.293104
         L2D. |   .6963282   2.453653     0.28   0.777    -4.112743    5.505399
         L3D. |  -5.455042   1.819026    -3.00   0.003    -9.020268   -1.889817
         L4D. |  -2.229855   2.028046    -1.10   0.272    -6.204751    1.745042
              |
        pagri |
          LD. |   .3668812   .2428774     1.51   0.131    -.1091497    .8429122
         L2D. |  -.2100181   .2250688    -0.93   0.351    -.6511449    .2311086
         L3D. |   .5270011   .2035173     2.59   0.010     .1281145    .9258876
         L4D. |   .1468817   .2756028     0.53   0.594    -.3932898    .6870533
              |
        _cons |    3554450    1526307     2.33   0.020     562943.1     6545958
------------------------------------------------------------------------------
```

Appendix 5: VAR(p) Results for Equation 4

Appendix 5.1: VAR(p) for Capital-Intensive Sector

```
. var D1.lnfdifl D1.wmnfg D1.emnfg D1.pmnfg, lags(1/4) lutstats

Vector autoregression

Sample:  1996 - 2021                            No. of obs      =        26
Log likelihood = -850.4616           (lutstats) AIC             =  58.99169
FPE            =  1.58e+26                      HQIC            =  59.88347
Det(Sigma_ml)  =  3.03e+23                      SBIC            =  62.08854

Equation           Parms      RMSE     R-sq      chi2     P>chi2
----------------------------------------------------------------
D_lnfdifl            17     .725067   0.3517   14.10764   0.5907
D_wmnfg              17     5.96993   0.6791   55.01982   0.0000
D_emnfg              17      175432   0.8192    117.793   0.0000
D_pmnfg              17     9.5e+06   0.8174     116.39   0.0000
----------------------------------------------------------------

------------------------------------------------------------------------------
             |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
D_lnfdifl     |
     lnfdifl |
          LD. |   -.453329   .2557641    -1.77   0.076    -.9546175    .0479594
         L2D. |  -.2276708   .2554111    -0.89   0.373    -.7282675    .2729258
         L3D. |  -.3768344   .1959098    -1.92   0.054    -.7608106    .0071417
```

```
         L4D. |  -.0846988   .2030841    -0.42   0.677    -.4827363    .3133387
              |
        wmnfg |
          LD. |   .0048315   .0228325     0.21   0.832    -.0399193    .0495823
         L2D. |  -.0157554   .0259348    -0.61   0.544    -.0665868    .0350759
         L3D. |   .0037828   .0212922     0.18   0.859    -.0379492    .0455149
         L4D. |   .0124362   .0274022     0.45   0.650    -.0412711    .0661434
              |
        emnfg |
          LD. |   1.51e-07   1.10e-06     0.14   0.891    -2.00e-06    2.30e-06
         L2D. |   7.49e-07   1.21e-06     0.62   0.537    -1.63e-06    3.13e-06
         L3D. |   9.53e-07   1.19e-06     0.80   0.423    -1.38e-06    3.28e-06
         L4D. |  -2.39e-07   1.17e-06    -0.20   0.839    -2.54e-06    2.06e-06
              |
        pmnfg |
          LD. |   5.38e-10   1.66e-08     0.03   0.974    -3.19e-08    3.30e-08
         L2D. |   2.20e-08   2.42e-08     0.91   0.364    -2.55e-08    6.94e-08
         L3D. |  -2.52e-08   1.94e-08    -1.30   0.195    -6.33e-08    1.29e-08
         L4D. |  -5.64e-09   2.50e-08    -0.23   0.822    -5.47e-08    4.34e-08
              |
        _cons |  -.0926057   .2091787    -0.44   0.658    -.5025884     .317377
-------------+----------------------------------------------------------------
D_wmnfg       |
      lnfdifl |
          LD. |   4.268616   2.105866     2.03   0.043     .1411952    8.396037
         L2D. |  -1.157731   2.102959    -0.55   0.582    -5.279456    2.963993
         L3D. |   3.913777   1.613048     2.43   0.015     .7522614    7.075292
         L4D. |   3.262013   1.672118     1.95   0.051    -.0152785    6.539304
              |
        wmnfg |
          LD. |   .1259204    .187994     0.67   0.503     -.242541    .4943818
         L2D. |  -.0812447   .2135377    -0.38   0.704    -.4997709    .3372814
         L3D. |   .2708846   .1753123     1.55   0.122    -.0727213    .6144904
         L4D. |  -.2151851   .2256191    -0.95   0.340    -.6573905    .2270203
              |
        emnfg |
          LD. |  -6.37e-06   9.03e-06    -0.71   0.480    -.0000241    .0000113
         L2D. |   .0000297   9.99e-06     2.97   0.003     .0000101    .0000492
         L3D. |  -5.27e-06   9.79e-06    -0.54   0.591    -.0000245    .0000139
         L4D. |  -7.59e-06   9.67e-06    -0.79   0.432    -.0000266    .0000114
              |
        pmnfg |
          LD. |   1.70e-07   1.36e-07     1.24   0.213    -9.76e-08    4.37e-07
         L2D. |  -3.50e-08   1.99e-07    -0.18   0.861    -4.26e-07    3.56e-07
         L3D. |  -4.14e-08   1.60e-07    -0.26   0.796    -3.55e-07    2.72e-07
         L4D. |   3.02e-07   2.06e-07     1.47   0.143    -1.02e-07    7.06e-07
              |
        _cons |   2.719226   1.722299     1.58   0.114    -.6564175     6.09487
-------------+----------------------------------------------------------------
D_emnfg       |
      lnfdifl |
          LD. |   143675.3   61882.94     2.32   0.020     22386.97    264963.6
         L2D. |   146157.5   61797.54     2.37   0.018     25036.52    267278.4
         L3D. |   88026.75      47401     1.86   0.063    -4877.495      180931
         L4D. |    86623.5   49136.84     1.76   0.078    -9682.933    182929.9
              |
        wmnfg |
          LD. |   21368.35   5524.388     3.87   0.000     10540.75    32195.95
         L2D. |  -2767.643   6275.014    -0.44   0.659    -15066.45     9531.16
         L3D. |   16285.12   5151.726     3.16   0.002     6187.919    26382.31
         L4D. |  -21446.88   6630.041    -3.23   0.001    -34441.52   -8452.242
              |
        emnfg |
          LD. |  -.3566507   .2654062    -1.34   0.179    -.8768373    .1635359
         L2D. |  -.0141852   .2935194    -0.05   0.961    -.5894727    .5611022
         L3D. |  -.3191028   .2877036    -1.11   0.267    -.8829914    .2447858
         L4D. |  -.5962058   .2842346    -2.10   0.036    -1.153295   -.0391162
              |
```

```
       pmnfg |
         LD. |  -.0020439    .004007    -0.51   0.610    -.0098974    .0058096
        L2D. |   .0005275   .0058587     0.09   0.928    -.0109554    .0120103
        L3D. |  -.0175997   .0047034    -3.74   0.000    -.0268182   -.0083812
        L4D. |   .0042165   .0060584     0.70   0.486    -.0076576    .0160907
             |
       _cons |   178567.7   50611.45     3.53   0.000     79371.05    277764.3
-------------+----------------------------------------------------------------
D_pmnfg      |
     lnfdifl |
         LD. |   1.35e+07    3343403     4.04   0.000      6965249    2.01e+07
        L2D. |    4225096    3338789     1.27   0.206     -2318811    1.08e+07
        L3D. |    3909871    2560975     1.53   0.127     -1109548     8929290
        L4D. |    1262684    2654759     0.48   0.634     -3940548     6465915
             |
       wmnfg |
         LD. |    1337645   298470.9     4.48   0.000     752652.9     1922637
        L2D. |  -25794.98   339025.7    -0.08   0.939    -690273.1    638683.2
        L3D. |   835530.6   278336.8     3.00   0.003     290000.5     1381061
        L4D. |   -1390715     358207    -3.88   0.000     -2092787   -688641.9
             |
       emnfg |
         LD. |  -19.45752   14.33933    -1.36   0.175     -47.5621    8.647056
        L2D. |  -2.861573   15.85823    -0.18   0.857    -33.94313    28.21998
        L3D. |  -18.29095   15.54401    -1.18   0.239    -48.75666    12.17475
        L4D. |  -23.46919   15.35659    -1.53   0.126    -53.56756    6.629173
             |
       pmnfg |
         LD. |  -.0639539   .2164879    -0.30   0.768    -.4882623    .3603546
        L2D. |  -.1514655   .3165338    -0.48   0.632    -.7718603    .4689294
        L3D. |  -.6788273   .2541156    -2.67   0.008    -1.176885   -.1807699
        L4D. |     .52425   .3273207     1.60   0.109    -.1172867    1.165787
             |
       _cons |   1.00e+07    2734429     3.67   0.000      4668429    1.54e+07
------------------------------------------------------------------------------
```

Appendix 5. 2: VAR(p) for Labor-Intensive Sector

```
. var D1.lnfdifl D1.wagri D1.eagri D1.pagri, lags(1/4) lutstats

Vector autoregression

Sample:  1996 - 2021                               No. of obs      =        26
Log likelihood = -818.8914               (lutstats)  AIC             =  56.56321
FPE            =  1.39e+25                         HQIC            =  57.45499
Det(Sigma_ml)  =  2.67e+22                         SBIC            =  59.66007

Equation           Parms      RMSE     R-sq      chi2     P>chi2
----------------------------------------------------------------
D_lnfdifl            17     .544975   0.6338   44.99532   0.0001
D_wagri              17     3.96918   0.8350   131.5299   0.0000
D_eagri              17      293217   0.6712   53.08516   0.0000
D_pagri              17     2.6e+06   0.7858    95.3792   0.0000
----------------------------------------------------------------

------------------------------------------------------------------------------
             |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
D_lnfdifl    |
     lnfdifl |
         LD. |   -.395238   .1831895    -2.16   0.031    -.7542829   -.0361931
        L2D. |  -.1051423   .1669355    -0.63   0.529      -.43233    .2220453
        L3D. |  -.4848019   .1438629    -3.37   0.001    -.7667679   -.2028358
        L4D. |   -.082565   .1596366    -0.52   0.605     -.395447     .230317
             |
       wagri |
```

LD.	.005753	.0302095	0.19	0.849	-.0534565	.0649625
L2D.	-.0044584	.0389228	-0.11	0.909	-.0807458	.071829
L3D.	.0000598	.0392126	0.00	0.999	-.0767955	.076915
L4D.	.0640808	.0480203	1.33	0.182	-.0300373	.1581989
eagri						
LD.	-3.14e-07	3.65e-07	-0.86	0.390	-1.03e-06	4.02e-07
L2D.	-3.77e-07	4.16e-07	-0.91	0.365	-1.19e-06	4.38e-07
L3D.	1.35e-06	3.80e-07	3.56	0.000	6.08e-07	2.10e-06
L4D.	4.47e-07	4.27e-07	1.05	0.296	-3.91e-07	1.28e-06
pagri						
LD.	-4.68e-09	3.87e-08	-0.12	0.904	-8.04e-08	7.11e-08
L2D.	2.99e-09	3.35e-08	0.09	0.929	-6.27e-08	6.87e-08
L3D.	3.88e-08	3.36e-08	1.15	0.249	-2.71e-08	1.05e-07
L4D.	-7.27e-09	4.26e-08	-0.17	0.864	-9.07e-08	7.62e-08
_cons	-.3334512	.1862194	-1.79	0.073	-.6984345	.0315321
D_wagri						
lnfdifl						
LD.	-.6161584	1.334213	-0.46	0.644	-3.231168	1.998851
L2D.	2.80959	1.215831	2.31	0.021	.4266049	5.192576
L3D.	1.351671	1.047788	1.29	0.197	-.7019553	3.405297
L4D.	-.7828653	1.162671	-0.67	0.501	-3.061659	1.495929
wagri						
LD.	.1309604	.2200229	0.60	0.552	-.3002765	.5621973
L2D.	.7409454	.2834843	2.61	0.009	.1853263	1.296565
L3D.	.2328435	.2855946	0.82	0.415	-.3269115	.7925985
L4D.	-.3873103	.3497434	-1.11	0.268	-1.072795	.2981742
eagri						
LD.	-3.60e-06	2.66e-06	-1.35	0.176	-8.82e-06	1.61e-06
L2D.	-8.26e-06	3.03e-06	-2.73	0.006	-.0000142	-2.32e-06
L3D.	1.28e-06	2.77e-06	0.46	0.644	-4.15e-06	6.71e-06
L4D.	4.03e-06	3.11e-06	1.30	0.195	-2.07e-06	.0000101
pagri						
LD.	4.73e-08	2.82e-07	0.17	0.867	-5.04e-07	5.99e-07
L2D.	5.96e-07	2.44e-07	2.44	0.015	1.18e-07	1.07e-06
L3D.	-1.45e-07	2.45e-07	-0.59	0.553	-6.25e-07	3.35e-07
L4D.	1.38e-07	3.10e-07	0.45	0.656	-4.70e-07	7.46e-07
_cons	.1725909	1.35628	0.13	0.899	-2.48567	2.830852
D_eagri						
lnfdifl						
LD.	-296767.7	98562.65	-3.01	0.003	-489946.9	-103588.4
L2D.	-116368.6	89817.41	-1.30	0.195	-292407.5	59670.29
L3D.	-85226.83	77403.48	-1.10	0.271	-236934.9	66481.2
L4D.	64740.26	85890.31	0.75	0.451	-103601.7	233082.2
wagri						
LD.	-66618.18	16253.8	-4.10	0.000	-98475.05	-34761.31
L2D.	-25828.96	20941.91	-1.23	0.217	-66874.35	15216.43
L3D.	34825.35	21097.8	1.65	0.099	-6525.568	76176.28
L4D.	46299.11	25836.68	1.79	0.073	-4339.849	96938.08
eagri						
LD.	-.1995581	.1965093	-1.02	0.310	-.5847092	.185593
L2D.	-.4454022	.2237827	-1.99	0.047	-.8840082	-.0067961
L3D.	-.0853412	.2046428	-0.42	0.677	-.4864337	.3157513
L4D.	-.0881302	.2299162	-0.38	0.701	-.5387577	.3624974
pagri						
LD.	-.017848	.020798	-0.86	0.391	-.0586114	.0229154
L2D.	.0388209	.0180371	2.15	0.031	.0034689	.0741729

```
        L3D. |   .0504314   .0180868     2.79   0.005      .014982    .0858809
        L4D. |   .0301898   .0229079     1.32   0.188    -.0147088    .0750885
             |
       _cons |  -130685.6   100192.8    -1.30   0.192      -327060    65688.73
-------------+----------------------------------------------------------------
D_pagri      |
     lnfdifl |
         LD. |   228206.1   880337.9     0.26   0.795     -1497225     1953637
        L2D. |   -1283553   802227.5    -1.60   0.110     -2855890      288784
        L3D. |   532704.3   691349.3     0.77   0.441    -822315.4     1887724
        L4D. |   -2431896   767151.7    -3.17   0.002     -3935486   -928306.5
             |
       wagri |
         LD. |  -241045.2   145175.1    -1.66   0.097    -525583.1    43492.71
        L2D. |   398693.3   187048.1     2.13   0.033     32085.75    765300.8
        L3D. |    -104290   188440.5    -0.55   0.580    -473626.5    265046.5
        L4D. |  -441868.6     230767    -1.91   0.056    -894163.6    10426.51
             |
       eagri |
         LD. |  -7.799005   1.755174    -4.44   0.000    -11.23908   -4.358928
        L2D. |   2.960251   1.998773     1.48   0.139    -.9572724    6.877775
        L3D. |   -8.79403    1.82782    -4.81   0.000    -12.37649   -5.211569
        L4D. |   2.662858   2.053557     1.30   0.195    -1.362039    6.687754
             |
       pagri |
         LD. |   .6753438    .185763     3.64   0.000     .3112549    1.039433
        L2D. |  -.4101754   .1611028    -2.55   0.011     -.725931   -.0944197
        L3D. |    .769701   .1615469     4.76   0.000     .4530749    1.086327
        L4D. |  -.2599256   .2046079    -1.27   0.204    -.6609497    .1410985
             |
       _cons |    2105263   894898.3     2.35   0.019     351294.9     3859232
------------------------------------------------------------------------------
```

Appendix 6: VAR(p) Results for Equation 5

Appendix 6.1: VAR(p) for Capital-Intensive Sector

```
. var D1.pmnfg D1.lnfdifl, lags(1/4) lutstats

Vector autoregression

Sample:  1996 - 2021                              No. of obs      =        26
Log likelihood = -475.4546            (lutstats)  AIC             =  32.12844
FPE            =  1.11e+14                        HQIC            =  32.35139
Det(Sigma_ml)  =  2.62e+13                        SBIC            =  32.90266

Equation           Parms      RMSE     R-sq      chi2     P>chi2
----------------------------------------------------------------
D_pmnfg              9     1.4e+07   0.2331   7.901092   0.4432
D_lnfdifl            9     .565829   0.2543   8.866282   0.3537
----------------------------------------------------------------

------------------------------------------------------------------------------
             |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
D_pmnfg      |
       pmnfg |
         LD. |  -.4283786   .1990232    -2.15   0.031    -.8184569   -.0383003
        L2D. |  -.4367179   .4856249    -0.90   0.368    -1.388525    .5150893
        L3D. |   .1189689    .399339     0.30   0.766    -.6637212     .901659
        L4D. |    .363554   .5710658     0.64   0.524    -.7557144    1.482822
             |
     lnfdifl |
         LD. |    7281142    5084026     1.43   0.152     -2683365    1.72e+07
        L2D. |    4451233    5293018     0.84   0.400     -5922891    1.48e+07
        L3D. |    1446751    4472912     0.32   0.746     -7319996    1.02e+07
        L4D. |   -1203444    4175308    -0.29   0.773     -9386898     6980010
```

```
             |
       _cons |   1.19e+07    5003762     2.37   0.018      2071264    2.17e+07
-------------+----------------------------------------------------------------
D_lnfdifl    |
       pmnfg |
         LD. |  -3.02e-10   7.97e-09    -0.04   0.970    -1.59e-08    1.53e-08
        L2D. |   2.51e-08   1.94e-08     1.29   0.197    -1.30e-08    6.32e-08
        L3D. |  -1.36e-08   1.60e-08    -0.85   0.396    -4.49e-08    1.78e-08
        L4D. |  -9.73e-09   2.29e-08    -0.43   0.670    -5.45e-08    3.51e-08
             |
     lnfdifl |
         LD. |  -.4644756   .2035337    -2.28   0.022    -.8633943   -.0655569
        L2D. |  -.1773122   .2119005    -0.84   0.403    -.5926295    .2380052
        L3D. |  -.3143203   .1790684    -1.76   0.079    -.6652879    .0366474
        L4D. |  -.1063604   .1671541    -0.64   0.525    -.4339765    .2212557
             |
       _cons |   .0031523   .2003204     0.02   0.987    -.3894686    .3957731
------------------------------------------------------------------------------
```

Appendix 6.2: VAR(p) for Labor-Intensive Sector

```
. var D1.pagri D1.lnfdifl, lags(1/4) lutstats

Vector autoregression

Sample:  1996 - 2021                               No. of obs      =        26
Log likelihood =  -438.292              (lutstats)  AIC             =  29.26979
FPE            =  6.37e+12                          HQIC            =  29.49273
Det(Sigma_ml)  =  1.50e+12                          SBIC            =    30.044

Equation           Parms      RMSE     R-sq      chi2     P>chi2
----------------------------------------------------------------
D_pagri              9     3.5e+06   0.2818   10.19967   0.2513
D_lnfdifl            9     .563645   0.2600   9.137079   0.3309
----------------------------------------------------------------

------------------------------------------------------------------------------
             |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
D_pagri      |
       pagri |
         LD. |   .1711671   .2089917     0.82   0.413    -.2384491    .5807833
        L2D. |  -.1192305   .1907564    -0.63   0.532    -.4931063    .2546452
        L3D. |   .3481681   .1988311     1.75   0.080    -.0415337    .7378699
        L4D. |   .0804595   .2189373     0.37   0.713    -.3486496    .5095687
             |
     lnfdifl |
         LD. |  -892093.2    1259519    -0.71   0.479     -3360706     1576519
        L2D. |   594870.6    1231712     0.48   0.629     -1819242     3008983
        L3D. |   -1130611    1091053    -1.04   0.300     -3269036     1007813
        L4D. |   -1268231    1006898    -1.26   0.208     -3241716    705253.3
             |
       _cons |    1514841   900104.3     1.68   0.092    -249331.2     3279013
-------------+----------------------------------------------------------------
D_lnfdifl    |
       pagri |
         LD. |   1.68e-08   3.38e-08     0.50   0.620    -4.94e-08    8.29e-08
        L2D. |  -3.26e-08   3.08e-08    -1.06   0.291    -9.30e-08    2.78e-08
        L3D. |   4.08e-08   3.21e-08     1.27   0.204    -2.21e-08    1.04e-07
        L4D. |  -1.69e-08   3.54e-08    -0.48   0.632    -8.63e-08    5.24e-08
             |
     lnfdifl |
         LD. |  -.3572509    .203455    -1.76   0.079    -.7560153    .0415134
        L2D. |  -.1954859   .1989632    -0.98   0.326    -.5854467    .1944749
        L3D. |  -.2321983    .176242    -1.32   0.188    -.5776262    .1132296
        L4D. |   -.050941   .1626482    -0.31   0.754    -.3697255    .2678435
             |
```

```
       _cons |   .0144436   .1453973     0.10   0.921    -.2705299     .299417
------------------------------------------------------------------------------
```

Appendix 7: Stata DO File

1. Set unit of analysis to time series

```
tsset year
```

2. Implement Phillips-Perron stationarity test

```
pperron deply
pperron D1.deply
pperron lnremit
pperron D.lnremit
pperron lnfdifl
pperron pmnfg
pperron D1.pmnfg
pperron wmnfg
pperron D1.wmnfg
pperron emnfg
pperron D1.emnfg
pperron pagri
pperron D1.pagri
pperron wagri
pperron D1.wagri
pperron D2.wagri
pperron eagri
pperron D1.eagri
```

3. Implement Engle-Granger cointegration test

```
egranger D1.deply D1.wmnfg D1.emnfg D1.pmnfg
egranger D1.lnremit D1.wmnfg D1.emnfg D1.pmnfg
egranger D1.lnfdifl D1.wmnfg D1.emnfg D1.pmnfg
egranger D1.deply D1.wagri D1.eagri D1.pagri
egranger D1.lnremit D1.wagri D1.eagri D1.pagri
egranger D1.lnfdifl D1.wagri D1.eagri D1.pagri
egranger D1.lnfdifl D1.pmnfg
egranger D1.lnfdifl D1.pagri
```

4. Determine optimal lag order

```
varsoc D1.deply D1.wmnfg D1.emnfg D1.pmnfg
varsoc D1.lnremit D1.wmnfg D1.emnfg D1.pmnfg
varsoc D1.lnfdifl D1.wmnfg D1.emnfg D1.pmnfg
varsoc D1.deply D1.wagri D1.eagri D1.pagri
varsoc D1.lnremit D1.wagri D1.eagri D1.pagri
varsoc D1.lnfdifl D1.wagri D1.eagri D1.pagri
varsoc D1.lnfdifl D1.pmnfg
varsoc D1.lnfdifl D1.pagri
```

5. Estimate VAR(*p*) model then generate OIRF and FEVD

```
var D1.deply D1.wmnfg D1.emnfg D1.pmnfg, lags(1/4) lutstats
irf create order1, step(10) set(myirf1, replace)
irf graph oirf, impulse(D.deply) response(D.wmnfg)
irf graph fevd, impulse(D.deply) response(D.wmnfg)
irf graph oirf, impulse(D.deply) response(D.emnfg)
irf graph fevd, impulse(D.deply) response(D.emnfg)
irf graph oirf, impulse(D.deply) response(D.pmnfg)
irf graph fevd, impulse(D.deply) response(D.pmnfg)

var D1.deply D1.wagri D1.eagri D1.pagri, lags(1/4) lutstats
irf create order1, step(10) set(myirf1, replace)
irf graph oirf, impulse(D.deply) response(D.wagri)
irf graph fevd, impulse(D.deply) response(D.wagri)
irf graph oirf, impulse(D.deply) response(D.eagri)
irf graph fevd, impulse(D.deply) response(D.eagri)
irf graph oirf, impulse(D.deply) response(D.pagri)
irf graph fevd, impulse(D.deply) response(D.pagri)

var D1.lnremit D1.wmnfg D1.emnfg D1.pmnfg, lags(1/4) lutstats
irf create order1, step(10) set(myirf1, replace)
irf graph oirf, impulse(D.lnremit) response(D.wmnfg)
irf graph fevd, impulse(D.lnremit) response(D.wmnfg)
irf graph oirf, impulse(D.lnremit) response(D.emnfg)
irf graph fevd, impulse(D.lnremit) response(D.emnfg)
irf graph oirf, impulse(D.lnremit) response(D.pmnfg)
irf graph fevd, impulse(D.lnremit) response(D.pmnfg)

var D1.lnremit D1.wagri D1.eagri D1.pagri, lags(1/4) lutstats
irf create order1, step(10) set(myirf1, replace)
irf graph oirf, impulse(D.lnremit) response(D.wagri)
irf graph fevd, impulse(D.lnremit) response(D.wagri)
irf graph oirf, impulse(D.lnremit) response(D.eagri)
irf graph fevd, impulse(D.lnremit) response(D.eagri)
irf graph oirf, impulse(D.lnremit) response(D.pagri)
irf graph fevd, impulse(D.lnremit) response(D.pagri)

var D1.lnfdifl D1.wmnfg D1.emnfg D1.pmnfg, lags(1/4) lutstats
irf create order1, step(10) set(myirf1, replace)
irf graph oirf, impulse(D.lnfdifl) response(D.wmnfg)
irf graph fevd, impulse(D.lnfdifl) response(D.wmnfg)
irf graph oirf, impulse(D.lnfdifl) response(D.emnfg)
irf graph fevd, impulse(D.lnfdifl) response(D.emnfg)
irf graph oirf, impulse(D.lnfdifl) response(D.pmnfg)
irf graph fevd, impulse(D.lnfdifl) response(D.pmnfg)

var D1.lnfdifl D1.wagri D1.eagri D1.pagri, lags(1/4) lutstats
irf create order1, step(10) set(myirf1, replace)
irf graph oirf, impulse(D.lnfdifl) response(D.wagri)
```

```
irf graph fevd, impulse(D.lnfdifl) response(D.wagri)
irf graph oirf, impulse(D.lnfdifl) response(D.eagri)
irf graph fevd, impulse(D.lnfdifl) response(D.eagri)
irf graph oirf, impulse(D.lnfdifl) response(D.pagri)
irf graph fevd, impulse(D.lnfdifl) response(D.pagri)

var D1.pmnfg D1.lnfdifl, lags(1/4) lutstats
irf create order1, step(10) set(myirf1, replace)
irf graph oirf, impulse(D.pmnfg) response(D.lnfdifl)
irf graph fevd, impulse(D.pmnfg) response(D.lnfdifl)

var D1.pagri D1.lnfdifl, lags(1/4) lutstats
irf create order1, step(10) set(myirf1, replace)
irf graph oirf, impulse(D.pagri) response(D.lnfdifl)
irf graph fevd, impulse(D.pagri) response(D.lnfdifl)
```